3.2 VEGETATION, WETLANDS, WILDLIFE AND HABITAT, FISHERIES, AND THREATENED AND ENDANGERED SPECIES

This section discusses five elements: vegetation, wetlands, wildlife and habitat, fisheries, and threatened and endangered species. It discusses the affected environment, addresses potential impacts on these elements associated with the proposed project, and identifies mitigation measures designed to limit those impacts.

The vegetation and wetland sections discuss upland vegetation and wetland communities within the KVWPP area. Wildlife and habitat of the project site are discussed together because of the close interaction between these two resources. The fisheries section discusses freshwater habitat and potential fish use. The threatened and endangered species section addresses threatened and endangered plant, wildlife, and fish species that are regulated under the Endangered Species Act (ESA).

Within this section the term project area is used in reference to the approximately 5- by 3.5-mile area that includes all project-related activities. The term project site is used in reference to the actual locations within the project area where construction and operation activities would occur. A project vicinity map is shown on Figure 1-1. The project site is shown on Figure 2-1.

The analysis of existing conditions and potential effects resulting from the construction and operation of the proposed project is based on literature review, agency information, and onsite surveys conducted in 2002 and 2003 by the Applicant's consultants. Information for this section is summarized primarily from the ASC (Sagebrush Power Partners LLC 2003a, Section 3.4 [Plants and Animals], Exhibit 8 [Rare Plant Report], Exhibit 9 [Project Habitat Map], Exhibit 11 [Wildlife Baseline Study], and Exhibit 12 [Biological Assessment]). Subsequent correspondence from the Applicant includes the April 13, 2003 Technical Memorandum, *Potential Stream Crossing for the Kittitas Valley Wind Power Project* (Sagebrush Power Partners LLC 2003c), the May 23, 2003 Technical Memorandum, *Kittitas Valley Wind Power Project Rare Plant Report Addendum #1* (Sagebrush Power Partners LLC 2003f), and the August 2003 *Joint Aquatic Resources Permit Application* (Sagebrush Power Partners LLC 2003i). Where additional sources of information have been used to evaluate the potential impacts associated with the proposed project, those sources have been cited.

3.2.1 Background

Methods

Extensive wildlife surveys were performed as part of the project analysis. Wildlife surveys performed for the project emphasized birds and big game. Point count and in-transit surveys were performed. Additionally, aerial surveys within approximately two miles of the KVWPP project area identified visible raptor nests. To estimate the number of wintering bald eagles in the project vicinity, transect surveys were performed by driving through the survey area. As part of

the analysis for these surveys, results were compared to seven other wind development projects in the western United States. These projects include Buffalo Ridge (Minnesota), Foote Creek Rim (Wyoming), Klondike (Oregon), Nine Canyon (Washington), Zintel Canyon (Washington), Stateline (Oregon/Washington), and Vansycle (Oregon).

To identify and evaluate protected vegetation, wildlife species, and habitats, existing documentation and information were gathered from a variety of sources. The Applicant's consultants contacted the U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA) Fisheries (previously known as National Marine Fisheries Service), and the Washington Department of Fish and Wildlife (WDFW) to provide information on federal and state protected species that may occur in or near the project area. Information from the WDFW Priority Habitats and Species database and the Washington Department of Natural Resources (Washington DNR) Natural Heritage Program was reviewed regarding priority habitats and sensitive plant and wildlife species that may occur in or near the project area. A Biological Assessment (BA) prepared by the Applicant for the project was reviewed to provide information on threatened and endangered species identified by the USFWS and NOAA Fisheries as potentially occurring within the proposed project area. Shapiro and Associates, Inc. also consulted with WDFW to obtain their input and guidance on issues and concerns regarding plants, animals, and fisheries, and with Ecology to ensure concerns regarding wetland impacts are adequately addressed.

Federal Laws and Regulations

Section 7 of the federal ESA of 1973 (as amended) requires an analysis of the effects of major construction projects on any federally listed or proposed threatened or endangered species that may use the project area if there is a federal nexus. Consultation with the USFWS and NOAA Fisheries is necessary if any threatened or endangered species would be affected by a project. Applicable regulations are found in the Code of Federal Regulations (50 CFR 17).

The Migratory Bird Treaty Act (16 USC 703-711) prohibits the taking, killing, or possession of migratory birds except as allowed by the Secretary of the Interior. The list of migratory birds is found in 50 CFR 10, and permit regulations are found in 50 CFR 21.

The federal Bald Eagle Protection Act (16 CFR 668-668c) prohibits the taking, possession, purchase, sale, barter, transport, export, or import of any bald or golden eagle or any part, nest, or egg of a bald or golden eagle, except for certain scientific, exhibition, and religious purposes. Eagle permit regulations are found in 50 CFR 22.

State Laws and Regulations

Washington State fish and wildlife laws are contained in RCW 75 and 77, respectively. These titles contain several sections generally applicable to the environmental review process.

Fish and aquatic habitats are protected under RCW 75.20, commonly referred to as the Hydraulic Code. Any environmental impacts that could occur in waters of the state below the ordinary high water mark would need to be addressed in a Hydraulic Project Approval process.

Bald eagles and protection of their habitat are addressed in RCW 77.12.650 and 77.12.655. Any taking of protected wildlife, which includes destroying eggs and removing raptor nest trees, is prohibited under RCW 77.16.120.

3.2.2 Affected Environment

Vegetation

Vegetation communities within the KVWPP site consist primarily of sagebrush and grasslands. There are riparian zones along ravines and lithosols (shallow soils) communities along ridgetops. The higher portions of the project area border the ponderosa pine zone (Franklin and Dyrness 1988).

The KVWPP is located at the eastern base of the Cascade Mountain range, at the western edge of the Columbia Basin physiographic province (Franklin and Dyrness 1988). This lowland province, surrounded on all sides by mountain ranges and highlands, covers a vast area of eastern Washington, and extends south into Oregon. The province is characterized by moderate topography incised by a network of streams and rivers that empty into the centrally located Columbia River.

The project is at the western edge of the Central Arid Steppe zone defined by the Washington State Gap Analysis (Cassidy et al. 1997). Their classifications for Eastern Washington steppe vegetation closely follow Daubenmire (1970). The Central Arid Steppe zone typically contains plant communities dominated by big sagebrush (*Artemisia tridentata*), bluebunch wheatgrass (*Pseudoroegnaria spicata* previously *Agropyron spicatum*), and Sandberg's bluegrass (*Poa secunda*). In many areas of the zone, the introduced species cheatgrass (*Bromus tectorum*) is common due to past and present disturbance factors (Cassidy et al. 1997).

Franklin and Dyrness (1988) also describe a number of plant associations that occur on lithosols within the shrub-steppe region. These specialized habitats within the Columbia Basin province are particularly important for the purposes of this investigation because lithosolic habitats occur commonly on the ridgetops within the project area. They are habitats with shallow stony soils over bedrock. Daubenmire (1970) recognizes a variety of lithosolic plant associations. All are typically composed of a uniform layer of Sandberg's bluegrass, over a crust of mosses and lichens, with a low shrub layer above. The primary difference in these communities is in the composition of the shrub layer. Within the project area, the shrub layer on these lithosols is principally composed of several different buckwheat (*Eriogonum*) species.

Specialized habitats such as lithosols occur throughout the region, although the extent of this habitat has not been quantified at a regional scale. Lithosols are of concern at the project site because they are a specialized subdominant habitat with unique characteristics and are both sensitive to disturbance and difficult to replace. The project site's lithosol areas are typically in "good" condition. Lithosols present in the surrounding region are likely to be of comparative quality because of similar land uses such as development and cattle use. The above descriptions of generalized vegetation zones and associations are based on climax communities, which typically develop over time in the absence of disturbance. Within the project area (as in most of the shrub-steppe region) many of the plant communities have been significantly modified due to numerous disturbance factors. Disturbance is especially pronounced in the valley bottoms and side slopes. Cattle grazing, wildfire frequency changes, introduction of exotic plant species, ground disturbance from development activities, and a host of other factors have resulted in plant communities that are kept at an early- to mid-seral stage of development. In addition, natural disturbance factors, such as lightning, have also affected the communities. Non-native aggressive invader species are common, and often dominate the community. Within the project area, the effects of these disturbances are common, although most of the communities are still dominated by native species. In many places, however, cheatgrass and bulbous bluegrass (*Poa bulbosa*) dominate the grass layer, and noxious weeds, such as diffuse knapweed (*Centaurea diffusa*), are common.

Several riparian areas associated with springs, seeps, and creeks also are present in the project area. These habitats are typically degraded from heavy cattle use, and much of the riparian vegetation has been removed. Common native riparian associates include chokecherry (*Prunus virginiana*), golden currant (*Ribes aureum*), various rush species (*Juncus* spp.), various speedwell species (*Veronica* spp.), and yellow monkeyflower (*Mimulus guttatus*).

Table 3.2-1 describes the general cover types and habitat conditions found along the proposed turbine string ridgetops. In addition, a habitat map for the entire project area is shown on Figure 3.2-1.

In the habitat descriptions that follow, ratings of habitat quality are based on general observed patterns of plant community composition, amount of non-native species, and overall vegetative structure. The habitat ratings are qualitative based on direct visual observations.

Expected community composition was based on past experience with similar habitats, and on tables and descriptive information presented in Daubenmire (1970) and Franklin and Dyrness (1973). When all or most of the characteristic plant species that would be expected in a particular association were present (at close to expected densities), the area was considered to have "good" community composition. The species to be expected in a particular area vary based on the plant association present. For example, good condition lithosol ridgetops would be expected to contain a very different species assemblage than a good condition riparian streambank. Conversely, where few or none of the expected characteristic species were present, the area was considered to have "poor" community composition. Poor community composition was most often observed in areas

Figure 3.2-1

where one or more weedy invaders had overtaken some (or all) of the native species. The amount of non-native species in an area was based on informal visual estimates of non-native cover. It was necessary to take into account the overall area being evaluated because small, dense patches of non-native species were present in some areas. For example, in some larger areas that were relatively weed-free overall, heavy weed densities were present along the road shoulders (Sagebrush Power Partners LLC 2003c).

Table 3.2-1: Summary of Habitats Associated with the Proposed Turbine Strings of the Project

Facility	Habitat Description
Turbine String A	Shallow-soiled lithosol alternates with deeper-soiled shrub-steppe habitat. Habitat quality is generally good: native species dominate the shallow soils, and native shrubs and forbs combine with native and non-native grasses to dominate the deeper soils.
Turbine String B	The north half of this string is located on a mosaic of shallow-soiled rocky areas and deeper-soiled shrub-steppe habitat. Habitat quality is generally good: native species dominate the shallow soils, and native shrubs and forbs combine with native and non-native grasses to dominate the deeper soils. Various limited ground and vegetation disturbance has occurred here from recreational activities (gun club). One noxious weed population was observed along a jeep trail that runs along this section of the proposed string. The south half of this string contains the same mosaic of shallow and deeper soils, however, a fire within the last 10 years has removed most of the shrubs, and the habitat now consists of a mix of native and non-native grasses and forbs, with widely scattered small shrubs. Habitat quality is generally fair. Weedy species are more common in the deeper-soiled areas, and several populations of noxious weeds are present.
Turbine String C	Shallow-soiled grassland and lithosol alternates with deeper-soiled shrub-steppe habitat. Habitat quality is generally good: native species dominate the shallow soils, and native shrubs and forbs combine with native and non-native grasses to dominate the deeper soils.
Turbine String D	The north half of this string is similar to String C with alternating lithosols and deeper-soiled habitats in generally good condition. The south half of this string is a continuation of the same deeper-soiled shrub-steppe habitat.
Turbine String E	This string consists mainly of deeper-soiled shrub-steppe habitat, with inclusions of shallow-soiled lithosol in the north half, and small patches of non-native species throughout. Much of the habitat in the string is in fair to good condition (i.e., dominated by native shrubs and forbs, and a mix of native and non-native grasses), although some areas have been burned recently, and one noxious weed population is present along the jeep trail, which runs the length of the ridgetop.
Turbine String F	This string contains mainly shallow-soiled lithosols, with some areas of deeper-soiled shrub-steppe in the south half. Habitat quality is generally good: native species dominate the shallow soils, and native shrubs and forbs combine with native and non-native grasses to dominate the deeper soils. However, a large gravel pit operation at the north end of this string has completely displaced the lithosol habitat in that area. A rough jeep trail runs the length of this proposed string.

Table 3.2-1: Continued

Facility	Habitat Description
Turbine String G	This string consists almost entirely of shallow-soiled lithosol habitat, with small areas of deeper-soiled shrub-steppe and deciduous thicket habitats in the north half and at the south end. Habitat quality is generally good: native species dominate the shallow soils, and native shrubs and forbs combine with native and non-native grasses to dominate the deeper soils. Two noxious weed populations were observed, one along a road at the north end of the string, and another in a small draw near the south end of the string. A well-developed jeep trail is present along the north half of the corridor.
Turbine String H	This string also consists almost entirely of shallow-soiled lithosol habitat, with areas of deeper-soiled shrub-steppe habitat at the north end, midpoint, and the south end. Habitat quality is generally good: native species dominate the shallow soils, and native shrubs and forbs combine with native and non-native grasses to dominate the deeper soils. However, there are two areas of major soil disturbance (blading) near the midpoint of the string, where the lithosol species have been largely replaced by non-native forbs and grasses. In addition, three populations of noxious weeds were observed along this string, near roads. Finally, one portion of the lithosol in the south end shows signs of heavy livestock use, although native plants continue to dominate. A well-developed two-lane gravel access road runs the length of this ridgetop, providing access for local landowners.
Turbine String I	This string consists primarily of shallow-soiled lithosol habitat, although portions of the middle section, and the entire southern tip, contain deeper-soiled shrub-steppe habitat, as well as small inclusions of grassland. Habitat quality is generally good: native species dominate the shallow soils, and native shrubs and forbs combine with native and non-native grasses to dominate the deeper soils. However, the areas of grassland are only of fair quality; they are dominated by non-native grasses and forbs, and one noxious weed population was observed at the south end of the string.
Turbine String J	The south half of the string is located mainly on deeper-soiled shrub-steppe habitat, with one area of shallow-soiled lithosol. Habitat quality is generally good: native species dominate the shallow soils, and native shrubs and forbs combine with native and non-native grasses to dominate the deeper soils. However, the south tip of the string consists of fair quality, shallow-soiled grassland dominated by non-native grasses and forbs. Two populations of noxious weeds were observed in this half of the string. The north half of this string contains the same general pattern of shallow and deeper soils; however, a fire within the last 5-10 years removed most of the shrubs, and the deeper-soiled habitat now consists of a mix of native and non-native grasses and forbs, with widely scattered small shrubs. Although overall habitat quality is fair, several small inclusions of generally good quality lithosol are present in this half of the string.
Intervening Facilities (access roads, electric lines, O&M facility, etc., located between turbine strings)	More than 40% of the potential project impact corridors are located off of the ridgetops, between the turbine strings. Primarily, these are connecting facilities such as access roads and electrical lines, but this percentage includes O&M areas also. These non-ridgetop habitats are typically deeper-soiled, and are generally more degraded from past disturbance than the ridgetop habitats. This is especially true in the valley bottoms, where cattle grazing and road impacts have created large areas dominated by non-native invader species. Overall, the non-ridgetop habitats within the impact corridors are in fair condition. However, habitat quality ranges from poor in many of the valley bottoms, to good on some of the canyon slopes.

Source: Sagebrush Power Partners LLC 2003a.

The following categories were used to describe habitat condition: "Excellent" (good community composition with negligible amounts of non-native weedy species, along with good vegetative structure); "Good" (fair to good community composition, dominated by native plants, although

with significant inclusions of non-native species in certain areas, and fair to good vegetative structure); "Fair" (fair community composition, with non-native species dominance or co-dominance in some or all layers, and fair vegetative structure); and "Poor" (poor community composition, dominated by non-native, weedy invaders in some or all layers, and poor vegetative structure) (Sagebrush Power Partners LLC 2003c).

Habitat quality within the project area ranges from poor in many of the valley bottoms, to good along some of the ridgetops and flats. Generally, the ridgetop habitats are in fair to good condition. More specifically, the ridgetop lithosols are typically in good condition, containing a relatively intact vegetative structure and few non-native species. The deeper-soiled ridgetop habitats are generally in fair condition, with certain areas dominated or co-dominated by non-native species in the grass layer.

The Applicant proposes to purchase and protect an approximately 550-acre area as a habitat mitigation site. The site is located between proposed turbine strings B and C (Sections 22 and 27, Township 19 North, Range 17 East, WM) and is adjacent to land owned by the Washington DNR. The mitigation parcel consists of two north-south trending ridges, with an unnamed creek and associated canyon running between them. Within the parcel, five different cover types have been mapped: moderately dense shrub-steppe (278 acres), sparse shrub-steppe (74 acres), grassland (189 acres), riparian tree (8 acres), and deciduous scrub thicket (2.8 acres). There are also several small inclusions of lithosol habitat on the eastern ridge. These are in good condition, dominated by native bunchgrasses (primarily Sandberg's bluegrass), as well as native forbs and low shrubs. Although high concentrations of noxious weeds were not found within the parcel, scattered patches and individuals (primarily diffuse knapweed [*Centaurea diffusa*]) are present throughout. Overall, the habitat quality in this parcel is in fair to good condition.

Wetlands

Wetlands within the KVWPP project area are rare and consist primarily of ephemeral areas within the riparian zone of ravines. Within or near the project site two potential wetlands were identified using the methods provided in the *U.S. Army Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) and the *Washington State Wetland Identification and Delineation Manual* (WIDM) (Ecology 1997).

Wetlands within or near the project site were delineated in April 2003. Using these methods, vegetation, soil, and hydrologic parameters were examined for wetland characteristics.

A technical memorandum identifying potential stream channels within the project site was prepared as part of the project analysis (Sagebrush Power Partners LLC 2003c). This memorandum included wetlands in its analysis. The final determination of jurisdictional status is at the discretion of the regulatory agencies. For consistency, the numbering system used in the technical memorandum is also used in this discussion. Potential wetlands locations (as well as stream crossings, discussed below under "Fisheries") are shown on Figure 3.2-2.

Potential wetland area A-1 is a nearly flat drainage basin located downslope of a man-made pond. An earthen berm had evidence of water seeping through a low swale and across Hayward Road to the southeast. A dirt road already crosses the area near the proposed access road. There was little water flow, but there were wet holes up to 3 feet wide and 6 inches deep in places. The weather ten days prior to the survey was seasonally cool and damp. The ground was damp in the lowest areas of the ravine and there was some wetland vegetation. Some characteristics of wetland hydrology and vegetation were present. Although this site marginally meets the definition of wetland, and might be determined by the agencies to be non-jurisdictional, for the purposes of evaluating all potential wetland areas, this area is now assumed to be jurisdictional waters.

Wetland S-1 is near the location of the proposed PSE substation and in the vicinity of an NWI-mapped wetland. The wetland is a large stock pond with earthen impoundments. A culvert takes high water from Dry Creek to flood the pond. Stock use, and perhaps rapid seasonal drainage, restrict vegetation at the pond.

Wildlife and Habitat

The project area consists primarily of long north-south trending ridges. Between the ridges are ephemeral and perennial creeks that flow into the Yakima River, which is located south of the project area. Slopes within the project area are generally less than 20 degrees but can reach 40 degrees or more in some of the valley bottoms. Elevations in the project area ranges from about 2,200 feet along US 97, to about 3,150 feet at the top of String G (Figure 2-1). Most of the project site would be located on areas of exposed ridgetops.

Vegetation communities associated with the project area are described in the Vegetation section above and are shown on the project habitat map (Figure 3.2-1). Table 3.2-1 describes the cover types and habitat conditions found within the project area. Vegetation communities are described in this section in the context of wildlife habitat.

Habitats within the proposed project area include a variety of vegetation communities, including: grassland, shrub-steppe, sagebrush, coniferous forest, deciduous tree and shrub, riparian, and developed areas. Lithosol habitat within the project area is included as a sub-category of the grassland, sagebrush, and shrub-steppe vegetation communities. As described in Table 3.2-1 and shown on the project habitat map (Figure 3.2-1), some of these vegetation communities have been characterized in even further detail. For example, conifer forests are identified as two vegetation cover types, dense and sparse. Shrub-steppe habitat is defined as three cover types, sparse, moderate, and dense. Overall, grassland, shrub-steppe, and sagebrush vegetation communities comprise a significant majority of habitat types within the project area and within the project site. Coniferous forest within the project area includes a relatively small area to the northwest where the perimeter of a ponderosa pine forest is located (Figure 3.2-1).

Habitat types within the proposed project area are not regionally unique (Daubenmire 1970; Franklin and Dyrness 1988; Cassidy et al. 1997; Johnson and O'Neil 2001). Coniferous forest

within and near the project area does not include stands of old-growth forest habitat. East of the Cascade mountain range, shrub-steppe communities extend from the northern border of Washington to the southern border of Oregon (Johnson and O'Neil 2001). Within about 50 miles east and south of the proposed project area there are several large areas of protected grassland, shrub-steppe, and sagebrush vegetation communities (the Colockum, Quilomene, and L.T. Murray wildlife areas and the Yakima Training Center) (WDFW 2003g).

WDFW maintains a database of species and habitats identified as priorities for management and preservation. A priority habitat is defined as a habitat type with unique or significant value to many species (WDFW 1996a). Priority habitat within the WDFW south-central region, which includes Kittitas County, includes stream, riparian, freshwater wetlands, and shrub-steppe habitats. These areas may or may not be regulated depending on the presence or absence of certain wildlife or plant species (e.g., threatened or endangered) or the significance of these areas in providing habitat requirements. Stream, riparian, freshwater wetlands, and shrub-steppe habitats occur within the project area. WDFW has only developed management recommendations for riparian habitats (WDFW 2003h).

Much of the shrub-steppe and grassland habitat in Eastern Washington has been converted to agricultural and grazing uses. According to WDFW (1996b), 323,946 acres of shrub-steppe habitat exist in Kittitas County compared to the historical total of 581,164 acres. Fragmentation of shrub-steppe habitat has likely lowered the suitability of Washington's shrub-steppe habitat for many native species (WDFW 1996b). Generally, as described below, wildlife species documented within the project area are relatively common and widespread in similar habitats in Washington (Ingles 1965; Nussbaum et al. 1982; Leonard et al. 1993; Brown et al. 1995; and Washington Ornithological Society 2003).

Riparian habitat associated with streams and seeps in the project area occur in low topographic areas between ridges. Riparian habitat in the project area is typically degraded from heavy cattle use. Much of the riparian vegetation has been removed and nonnative invasive species are growing in many of these disturbed areas. Stream channels in the project area, as described below in the Fisheries section, have intermittent flow during the year. Riparian systems associated with streams with year-round flows are generally considered to provide higher quality habitat for wildlife species that rely on aquatic habitat for breeding and foraging.

Developed areas within the project area include numerous unpaved roads and trails that range from all-weather gravel roads to bare-ground trails. Communication antenna clusters and transmission line corridors are located at several points within the project area. US 97 parallels the proposed turbine strings in the eastern portion of the project area and SR 10 runs along the Yakima River, south of the project area.

Following is a general description of wildlife species observed during field surveys. A comprehensive list of avian species observed during field surveys is provided in Appendix A, Table A-1.

Figure 3.2-2

A variety of native birds, mammals, and reptiles are expected to inhabit habitats in the project area and surrounding vicinity. Amphibians and other bird, mammal, and reptile species that rely on aquatic habitat for breeding and foraging are less likely to occupy the project area due to the lack of wetland habitat and relatively low quality riparian habitat. Wildlife diversity is generally related to the structure and plant species composition within vegetative communities. Wetlands and forested areas with well-developed vegetation layers are likely to support the greatest number of species and populations of wildlife (Brown 1985; Johnson and O'Neil 2001). Even-aged forest stands generally provide less diversity than mature mixed-aged forested areas.

As described above in the vegetation section, shrub-steppe, grassland, and sagebrush habitats in the project area are generally considered "fair" to "good" based on the plant community composition, the amount of non-native species, and overall vegetative structure. Grassland, shrub-steppe, and sagebrush habitats within the project area do not provide conditions typically associated with high-quality habitat for wildlife because of degraded conditions associated with current and historical grazing practices and the presence of non-native invasive species.

Compared to forested habitat, the low vertical structure diversity in grassland, shrub-steppe, and sagebrush habitats provides fewer habitat layers for wildlife, resulting in lower species diversity. Habitats with a shrub component generally have more diverse wildlife communities than grass-dominated habitats due to increased potential nesting and foraging areas. For example, there are 49 wildlife species closely associated with quality shrub-steppe habitat whereas there are only 34 species associated with quality grassland habitat. Habitats dominated by native plants have more species diversity than habitats dominated by non-native invasive plant species (Johnson and O'Neil 2001).

Shrub-steppe communities are characterized by a relatively small number of breeding bird species. Many species observed in shrub-steppe habitat breed in other habitats and are identified as they forage or migrate through the shrub-steppe habitat (Johnson and O'Neil 2001).

Mammal species diversity in shrub-steppe habitats is lower than in more structurally complex habitats such as forested areas. For example, 40 small mammal species are closely associated with forested habitats of Washington and Oregon, whereas 20 small mammal species are closely associated with shrub-steppe habitat (Johnson and O'Neil 2001).

Of the 32 amphibian species documented in Washington and Oregon, 10 are closely associated with shrub-steppe habitat. Compared to bird, mammal, and amphibian species, reptile diversity in shrub-steppe habitats is relatively high. Twenty-one of 28 reptile species in Washington and Oregon are closely associated with shrub-steppe habitats.

Birds

A total of 97 avian species were identified during the surveys and other site visits (Sagebrush Power Partners LLC 2003a, Section 3.4 and Exhibit 11). Passerines were the most abundant avian

group observed. Passerines species documented during surveys include aerial feeders such as swifts and swallows and gleaners including warblers, vireos, chickadees, kinglets, and sparrows. Passerine species use diverse habitats and occupy a variety of foraging and nesting niches. Passerine species typically nest and forage in wetlands, forest stands, riparian habitats, and within snags or duff created by decaying logs. Species of sparrows, finches, and grosbeaks observed during the surveys typically are associated with forest-edge habitat. Cumulatively, four passerines, American pipit (*Anthus rubescens*), American robin (*Turdus migratorius*), horned lark (*Eremophila alpestris*), and western meadowlark (*Sturnella neglecta*), composed 47% of the observations. No other species individually accounted for more than 5% of the observations.

Several species of woodpeckers, including northern flicker (*Colaptes auratus*), Lewis' woodpecker (*Melanerpes lewis*), and downy woodpecker (*Picoides pubescens*) were observed. These species rely on conifer forest stands with snags in varying stages of decay that provide habitat for nesting, foraging, and food caching.

The next most abundant avian group varied by season, with corvids (crows, ravens, and jays) higher in spring and fall, and raptors more prevalent in summer. Raptor species observed during the surveys include American kestrel (*Falco sparverius*); bald eagle (*Haliaeetus leucocephalus*); golden eagle (*Aquila chrysaetos*); turkey vulture (*Cathartes aura*); northern goshawk (*Accipiter gentilis*) red-tailed (*Buteo jamaicensis*), rough-legged (*Buteo lagopus*), sharp-shinned (*Accipter striatus*), and Cooper's hawks (*Accipiter cooperii*); and great horned owl (*Bubo virginianus*). These species inhabit dense coniferous and deciduous forests, foraging in open areas associated with wetlands, meadows, grasslands, riparian, and open water habitats. Most of the raptor species forage on small mammals. The most common raptor species observed were red-tailed hawks and American kestrels. Approximate bald eagle perches and raptor nest locations are shown on Figures 3.2-3 and 3.2-4, respectively.

Observed upland game birds include blue grouse (*Dendragapus obscurus*), ruffed grouse (*Bonasa umbellus*), California quail (*Callipepla californica*), and gray partridge (*Perdix perdix*).

Bird species unique to shrub-steppe habitats, such as sage thrasher (*Oreoscoptes montanus*) and sage grouse (*Centrocercus urophasianus*), were once common but are now in decline (Ritter and Paige 2000; Christensen 2000; Washington Department of Wildlife 1993). Sage thrasher was observed during project surveys. Sage grouse was not observed (Sagebrush Power Partners LLC 2003a, Section 3.4 and Exhibit 11).

Avian species observed during the surveys are known to occupy and/or breed in similar habitats in Washington and are generally common and widespread in Kittitas County and Eastern Washington (Washington Ornithological Society 2003).

Figure 3.2-3

Figure 3.2-4

Amphibians and Reptiles

Reptiles observed during the field studies included rubber boa (*Charina bottae*), Great Basin gopher snake (*Pituophis catenifer deserticola*), Northern Pacific rattlesnake (*Crotalus viridis oreganus*), and short-horned lizard (*Phrynosoma douglassii*). An amphibian chorus heard during spring surveys was identified as likely to be one of the true frog species (e.g., Cascade frog, *Rana cascadae*). Reptile and amphibian species observed during the surveys are known to occupy and/or breed in similar habitats in Washington and are generally common and widespread in Kittitas County and Eastern Washington (Nussbaum et al. 1982; Leonard et al. 1993; Brown et al. 1995).

Mammals

Field surveys confirmed the presence of mule deer (*Odocoileus hemionus*), elk (*Cervis elaphus*), and American pika (*Ochotona princeps*). Mule deer were frequently observed throughout the project area. Large groups and individuals of elk were observed near the northern points of the project area. American pika was heard regularly on the talus slopes in the western portion of the project area.

Based on the WDFW Priority Habitat and Species database, the project area is located adjacent to elk winter range, more than 3 miles southeast of elk calving areas, and more than 2 miles from the Quilomene elk migration corridor (Sagebrush Power Partners LLC 2003a, Exhibit 11). The project area is located within mule deer winter range. The boundaries of these features are shown on Figure 3.2-5.

Cover is an important component of elk wintering and calving habitat. Elk are grazers and concentrate browsing activity on shrubs and small-stature trees when grasses are not available. Elk rely on river bottom, floodplain, riparian, and forested upland habitats for wintering, calving, and migration (WDFW 2003c).

Elk and mule deer in the project area primarily occupy the grassland, shrub-steppe, and riparian corridor habitats. Fragmentation associated with existing human activity within the project area has likely reduced the quality of potential winter range. US 97, which accommodates an average of 2,200 vehicles a day, runs through the project area. Bettas and Hayward roads each serve approximately 20 vehicles per day.

The potential for bats to occur is based on key habitat elements such as food sources, water, and roost sites. Potential roost structures such as trees occur along drainages and riparian areas within the project area. Water resources associated with drainages in the project area may be used as foraging and watering areas, although flows in these drainages are intermittent. Little is known about bat species distribution, but several species of bats could occur in the project area according to the Washington Gap Analysis (WDFW n.d.).

Figure 3.2-5

Other mammals that likely exist within the project area include badger (*Taxidea taxus*), coyote (*Canis latrans*), pocket gopher (*Thomomys mazama*), bobcat (*Lynx rufus*), and other small mammals such as rabbits, voles and mice. Mammal species identified above are known to occupy and/or breed in similar habitats in Washington and are generally common and widespread in Kittitas County and Eastern Washington (Ingles 1965). Mammal species unique to shrub-steppe habitats, such as pygmy rabbit, which were once common, are now in decline (Ritter and Paige 2000; Christensen 2000; Washington Department of Wildlife 1993).

Wildlife Migration

The proposed project area does not currently support large congregations of mule deer or elk but is within an area considered winter range for these species (WDFW 2002). The project area is located within portions of the Lauderdale, Ellensburg, and SR 10 Mule Deer Wintering Areas and the Lookout Mountain Elk Winter Area. During the winter months, an influx of mule deer and elk move from the surrounding mountains to the west and north into these winter areas. Based on the information in the WDFW Priority Habitats and Species database, it is estimated that between 200 and 400 mule deer and 50 elk winter in these areas. No distinct migration routes have been identified within the project area. The Quilomene Elk Migration Corridor is located north and east of the project area (WDFW 2002). It is likely that wintering mule deer and elk move in from surrounding areas through undeveloped tracts of land.

Reptiles and amphibians are present in the project area and may be concentrated in areas of suitable habitat (e.g., wetlands). No migration corridors for reptiles or amphibians are known to be present in the project area. Many amphibians migrate short distances during spring or fall breeding periods to and from suitable wetlands and during fall dispersal of juveniles.

The project area is located within the Pacific Flyway, one of four principal north-south bird migration routes in North America. Bounded roughly by the Pacific Ocean and the Rocky Mountains, the Pacific Flyway extends from the Arctic regions of Alaska and Canada to Central and South America. Within the flyway, certain groups of birds may travel along narrower migration corridors, with more well-defined paths.

The project area location along the east flank of the Cascades places it within possible migration corridors of several bird species, and the Yakima River riparian corridor south of the project area may also be used by migrating songbirds. The river provides a distinct geographic visual cue to migrating birds and provides resting habitat for waterfowl. Riparian habitat along the river provides resting and foraging habitat for songbirds and raptors.

Passerine use of the project area documented during the project surveys was highest in the spring and fall compared to summer, suggesting some migrant use during the migration seasons. Overall, raptor use was relatively similar in the spring and summer periods, and slightly lower in the fall. Accipiter use, Cooper's hawk, northern goshawk, and sharp-shinned hawk, was highest in the spring, likely due to migrant hawks returning or passing through from wintering grounds.

Waterfowl occasionally were observed during the surveys within the project area (Table A-1, Appendix A). Waterfowl use is expected to be higher south of the project area near the Yakima River. Some waterfowl use can be expected associated with drainages within the project area and along Swauk Creek to the west of the project area (WDFW 2002).

Some species of bats may also migrate through the project area. At least two species of bats, hoary bat (*Lasiurus cinereus*) and silver-haired bat (*Lasonycteris noctivagans*), are known to migrate through Washington. Other species such as little brown bat (*Myotis lucifugus*) and big brown bat (*Eptesicus fuscus*) may make localized short-distance migrations to suitable hibernacula sites (e.g., caves, mines). Bats typically migrate at night, and are most frequently observed migrating during August and mid-September.

Fisheries

Based on the literature review, there are no fish-bearing aquatic resources located within the project area. Potential fish habitat within the project area is limited to low topographic areas between ridges. The WDFW Priority Habitat and Species database does not identify any fish-bearing streams within the project area. The nearest fish-bearing aquatic resources include the Yakima River, located more than 0.5 mile south of the project area, and Swauk Creek located more than 0.5 mile west of the project area. Within the project area, low topographic areas between ridges contain stream channels and seeps that flow into the Yakima River (Figure 3.2-1). These streams are small, narrow channels with intermittent flows that do not provide habitat for resident or anadromous fish.

A technical memorandum identifying potential stream channels within the project site was prepared as part of the project analysis (Sagebrush Power Partners LLC 2003c). The investigation was performed in April 2003. This report identified areas within the project site with characteristics that would possibly be classified as jurisdictional waters of the United States (well-defined banks, streambed, and evidence of hydrology). This report identified six areas with these characteristics that occur within or adjacent to elements of the proposed project. The final determination of jurisdictional status is at the discretion of the regulatory agencies.

Characteristics of potential stream channels are summarized in Table 3.2-2. Potential stream channel crossings were numbered in the technical memorandum based on the letter of the nearest turbine string. For consistency, the numbering system used in the technical memorandum is also used in this discussion. Potential stream channel crossing locations, as identified in the technical memorandum, are shown on Figure 3.2-2.

Table 3.2-2: Characteristics of Potential Stream Channel Crossings within the Project Area

Stream Channel	Flow	Characteristics	Location
Stream I-1	Intermittent	6 inches deep and 6 feet wide, evidence of periodic flooding at higher levels was observed, no flow during investigation, substrate coarse gravels and cobbles	Located on an existing road in the southern portion of the project area.
Stream G-1	Intermittent	1 inch deep and 12 inches wide, no flow during investigation, a culvert that drains the ravine below US 97 had a high-water stain of 6 inches	A ravine ascending northwest from US 97 near a proposed access road to the G turbine string.
Stream H-1	Intermittent	6 feet wide and 18 inches deep, flow in the channel was 6 inches deep, well-defined stream bed and stream banks	Near a proposed access road in the northern segment of the project area.
Stream I-2	Intermittent	2 feet wide and 6 inches deep, flow in the channel was 3 inches deep	In the valley to the east of Stream H-1.
Stream J-1	Intermittent	4 feet wide and 6 inches deep, flow in the channel was 2 inches deep, degraded due to livestock activity and the presence of a variety of noxious weeds adjacent to the stream	East of Stream I-2 in the northeast portion of the project area.
Stream J-2	Intermittent	6 feet wide and 12 inches deep, no flow during investigation	Approximately 0.5 mile downslope of Stream J-1.

Source: Sagebrush Power Partners LLC 2003c.

Rivers and streams in Kittitas County are classified according to the Washington State stream typing system, as defined in Chapter 222-16-030 WAC. Ecology and the Washington DNR recognize the WAC stream typing system.

The following paragraph is taken from the WAC (222-16-030):

> (5) "Type 5 Waters" means all segments of natural waters within the bankfull width of the defined channels that are not Type 1, 2, 3, or 4 Waters. These are seasonal, nonfish habitat streams in which surface flow is not present for at least some portion of the year and are not located downstream from any stream reach that is a Type 4 Water. Type 5 Waters must be physically connected by an above-ground channel system to Type 1, 2, 3, or 4 Waters.

Based on existing fish utilization and habitat characteristic information, streams within the project area would be classified as Type 5 Waters according to guidelines established in Chapter 222-16-030 of the WAC. The streams do not support fish populations, do not have surface flow during portions of the year, and are not located downstream of a Type 4 Water (WAC 222-16-030). A Type 5 Water is the smallest stream classification according to the Washington State stream typing system. The Kittitas County Critical Areas Ordinance (Chapter 17A) does not have protective buffer requirements for Type 5 systems. Buffer requirements for Type 4 systems are 10 to 20 feet.

Threatened and Endangered Species

Section 7(c) of the ESA of 1973 requires an analysis of the effects of construction projects with a federal nexus (permits, funds, land) on any federally listed or proposed threatened or endangered species that may use the project site. Consultation with USFWS and NOAA Fisheries is necessary if any threatened or endangered species would be adversely affected by the project. Applicable regulations are found in 50 CFR 17. The ESA does not protect candidate species and species of concern, but if a species were to be elevated to the proposed, endangered, or threatened category once the project had begun, additional analysis would be required to determine the project's potential effects on that species.

A BA prepared for the project in 2002 was reviewed to provide information on threatened and endangered species documented as potentially occurring near the proposed project site (Sagebrush Power Partners LLC 2003a, Exhibit 12). Plant, wildlife, and fish species identified by USFWS, NOAA Fisheries, and/or WDFW as likely to occur in the project vicinity are discussed below.

Plant Species

Two rare plant investigations were conducted in the project area in 2002 and in 2003. The survey corridors and findings of these two investigations are described below.

The first investigation was conducted in the spring-summer of 2002. This investigation began with a pre-field review of existing data to determine the rare plant species with potential for occurrence in the project area. Target species included all USFWS endangered, threatened, proposed, or candidate plant species, as well as all Washington State endangered, threatened, sensitive, and review plant species. The pre-field review identified 38 rare plant species that had the potential to occur in the project area, as shown in Table A-2 in Appendix A.

Three field surveys of the project area were performed (April, June, and July 2002) to determine the presence of target species. The survey corridors included all land within 50 meters of proposed project facilities (e.g., turbine strings, access roads, staging areas, etc.) as defined through July 2002. The 2002 rare plant field surveys did not locate any federal endangered, threatened, proposed, or candidate plant species.

Marginal potential habitat was found for one federally listed species, Ute ladies'-tresses (*Spiranthes diluvialis*), in several of the project area riparian zones. However, the project area is west of the species' known range, and the habitat at these sites was degraded due to past disturbance. Both these factors greatly reduced the potential for occurrence of Ute ladies'-tresses.

Marginal potential habitat was found for one federal candidate species, basalt daisy (*Erigeron piperianus*). Although basalt daisy is typically restricted to the extensive cliffs along the Yakima River and Selah Creek, all cliffs within the project area were searched intensively for the presence

of the species with negative results. Marginal potential habitat was also found within the study area for a number of federal species of concern. These include Columbia milkvetch (*Astragalus columbianus*), Hoover's desert-parsley (*Lomatium tuberosum*), least phacelia (*Phacelia minutissima*), Seely's silene (*Silene seelyi*), and Hoover's tauschia. In all cases, where potential habitat was found for these species, the area was searched carefully, with negative results.

Likewise, the field surveys did not locate any plants listed as endangered, threatened, or sensitive by Washington State. Potential habitat, however, was found for several of these species throughout the project area. These habitats were searched thoroughly for the presence of the target species, but none was found.

One species that was recently removed from the Washington State review list was found within, or immediately adjacent to, the project area. The species, white-margined knotweed (*Polygonum polygaloides* ssp. *kelloggii*), was found in the project area in vernally moist draws and swales. However, since the original 2002 rare plant survey was conducted, white-margined knotweed has been dropped from the Washington Natural Heritage Program (WNHP) list.

Subsequent changes to the project layout resulted in siting proposed facilities in areas that were not covered during the original 2002 rare plant surveys. To adequately evaluate project-related rare plant impacts, additional field surveys were conducted in May 2003. Overall, 331 acres of ground were surveyed in May 2003 along a 50-meter buffer corridor (Sagebrush Power Partners LLC 2003f).

The 2003 field surveys did not locate any USFWS endangered, threatened, proposed, or candidate plant species. Marginal potential habitat was found, however, for a number of Federal 'Species of Concern'. These include Columbia milkvetch, Hoover's desert-parsley, least phacelia, and Seely's silene. In all cases, where potential habitat was found for these species, the area was searched carefully, with negative results.

The field surveys did not locate any plants listed as endangered, threatened, sensitive, extirpated, or review by the WNHP. However, potential habitat was found for a number of these species throughout the project area. These habitats were also searched thoroughly for the presence of the target species, but none was found.

Wildlife and Fish Species

Table 3.2-3 presents a list of 55 wildlife and fish species (26 bird, 14 mammal, 2 reptile, 6 amphibian, and 7 fish) with federal and/or state status identified by USFWS, NOAA Fisheries, and/or WDFW as potentially occurring near or within the project area. Of these 55 species, seven species are federally listed threatened or endangered species, and as such are currently protected under the ESA. Five species on Table 3.2-3 with state monitor status were not identified during the agency review as potentially occurring near or within the project area. However, these species are included in the table because they were documented during avian surveys. Table 3.2-4

identifies any documented use in the project area and/or surrounding area, and the potential for use of the project area of all wildlife and fish species with federal and/or state status.

Species are identified as likely, possibly, or unlikely to occur in or near the project area. All seven fish species are identified as not occurring in the project area due to the lack of potentially suitable fish habitat. Species are identified as unlikely to occur due to limited potential habitat or because the project area is located outside the periphery of the known species distributions. Species are identified as possibly occurring if potential habitat is available but individuals have not been documented in or near the project area. Species that have been documented in or near the project area are identified as likely to occur.

Twenty-two species (10 bird, 8 mammal, and 4 amphibian) are identified as unlikely to occur due to limited potential habitat or because the project area is located outside the periphery of the known species distributions. Thirteen species (3 bird, 6 mammal, 2 reptile, and 2 amphibian) are identified as possibly occurring because potential habitat is available but individuals have not been documented within the project area vicinity. Thirteen bird species documented in the project area vicinity during surveys are identified as likely to occur.

USFWS indicates that there are five federally listed species under USFWS jurisdiction that are likely to occur in the project vicinity: bald eagle (*Haliaeetus leucocephalus*), northern spotted owl (*Strix occidentalis caurina*), grizzly bear (*Ursus arctos*), gray wolf (*Canis lupus*), and bull trout (*Salvelinus confluentus*). Gray wolf is a federally listed endangered species. Bald eagle, northern spotted owl, grizzly bear, and bull trout, are federally listed threatened species (Table 3.2-3).

Federally listed threatened species under the jurisdiction of the NOAA Fisheries include chinook salmon (*Oncorhynchus tshawytscha*) and middle Columbia River steelhead (*Oncorhynchus mykiss*) (Table 3.2-3).

Based on an analysis and review of natural resource documents and information from natural resource agencies, one federally listed species, bald eagle, regularly occurs within the project area. No other federally listed species regularly forages, breeds, or occurs in or near the project area.

Table 3.2-3: Federal and State Protected Wildlife Species Identified by Federal and State Agencies as Potentially Occurring near or within the Project Area

Common Name	Scientific Name	Federal Status	Washington State Status
Birds			
Bald eagle	*Haliaeetus leucocephalus*	Threatened	Threatened
Northern spotted owl	*Strix occidentalis caurina*	Threatened	Endangered
Black tern	*Chlidonias niger*	Species of concern	Monitor
Burrowing owl	*Athene cunicularia*	Species of concern	None
Ferruginous hawk	*Buteo regalis*	Species of concern	Threatened
Harlequin duck	*Histrionicus histrionicus*	Species of concern	None
Loggerhead shrike	*Lanius ludovicianus*	Species of concern	Candidate
Northern goshawk	*Accipiter gentilis*	Species of concern	Candidate
Olive-sided flycatcher	*Contopus cooperii*	Species of concern	None
Peregrine falcon	*Falco peregrinus*	Species of concern	Sensitive
Willow flycatcher	*Empidonax traillii*	Species of concern	None
Black-backed woodpecker	*Picoides arcticus*	None	Candidate
Golden eagle	*Aquila chrysaetos*	None	Candidate
Lewis' woodpecker	*Melanerpes lewis*	None	Candidate
Long-billed curlew[1]	*Numenius americanus*	None	Monitor
Merlin	*Falco columbarius*	None	Candidate
Flammulated owl	*Otus flammeolus*	None	Candidate
Gyrfalcon[1]	*Falco rusticolus*	None	Monitor
Osprey[1]	*Pandion haliaetus*	None	Monitor
Pileated woodpecker	*Dryocopus pileatus*	None	Candidate
Prairie falcon[1]	*Falco mexicanus*	None	Monitor
Sage sparrow	*Amphispiza belli*	None	Candidate
Sage thrasher	*Oreoscoptes montanus*	None	Candidate
Turkey vulture[1]	*Cathartes aura*	None	Monitor
Vaux's swift	*Chaetura vauxi*	None	Candidate
White-headed woodpecker	*Picoides albolarvatus*	None	Candidate
Mammals			
Gray wolf	*Canis lupus*	Endangered	Endangered
Grizzly bear	*Ursus arctos*	Threatened	Endangered
Fisher	*Martes pennanti*	Species of concern	Endangered
Fringed myotis	*Myotis thysanodes*	Species of concern	None
Long-eared myotis	*Myotis volans*	Species of concern	None
Long-legged myotis	*Myotis evotis*	Species of concern	None
Small-footed myotis	*Myotis ciliolabrum*	Species of concern	None
Townsend's big-eared bat	*Corynorhinus townsendii*	Species of concern	Candidate
Yuma myotis	*Myotis yumanensis*	Species of concern	None
Western gray squirrel	*Sciurus griseus*	Species of concern	Threatened
Wolverine	*Gulo gulo*	Species of concern	Candidate
Black-tailed jackrabbit	*Lepus californicus*	None	Candidate
Merriam's shrew	*Sorex merriami*	None	Candidate
White-tailed jackrabbit	*Lepus townsendii*	None	Candidate
Amphibians and Reptiles			
Cascades frog	*Rana cascadae*	Species of concern	None
Columbia spotted frog	*Rana luteiventris*	Species of concern	Candidate
Larch Mountain salamander	*Plethodon larselli*	Species of concern	Sensitive
Red-legged frog	*Rana aurora*	Species of concern	None
Tailed frog	*Ascaphus truei*	Species of concern	Monitor

Table 3.2-3: Continued

Common Name	Scientific Name	Federal Status	Washington State Status
Western toad	*Bufo boreas*	Species of concern	Candidate
Sharptail snake	*Contia tenuis*	None	Candidate
Striped whipsnake	*Masticophis taeniatus*	None	Candidate
Fish			
Bull trout	*Salvelinus confluentus*	Threatened	Candidate
Chinook salmon	*Oncorhynchus tshawytscha*	Threatened	Candidate
Steelhead	*Oncorhynchus mykiss*	Threatened	Candidate
Interior Redband trout	*Oncorhynchus mykiss gairdneri*	Species of concern	None
Pacific lamprey	*Lampetra tridentate*	Species of concern	None
Westslope cutthroat	*Oncorhynchus clarki lewisi*	Species of concern	None
Mountain sucker	*Catostomus platyrhynchus*	None	Candidate

Source: Sagebrush Power Partners LLC 2003a.
1 Not identified by state agencies as potentially occurring in project area, but documented during surveys.

Table 3.2-4: Potential Occurrence of Federal and State Protected Wildlife and Fish Species within the Project Area

Common Name	Potential Occurrence within Project Area
Birds	
Bald eagle	Likely, WDFW documented winter resident, average of 5.6 bald eagles documented per winter driving survey with a maximum survey day count of 12, winter use relatively high compared to other wind projects, but mostly along Yakima River
Black tern	Unlikely due to species distribution in Washington, no records within Kittitas County
Black-backed woodpecker	Unlikely, breeding habitat possible in forests/burns near project area, recorded in Kittitas County
Burrowing owl	Unlikely due to species distribution in Washington, possible in extreme eastern Kittitas County
Ferruginous hawk	Unlikely, most records in Eastern Washington in steppe zones, possible rare transient or migrant
Flammulated owl	Unlikely within project area, possible in forests near project area, recorded in Kittitas County
Golden eagle	Likely, six observations during fixed-point surveys, six during in-transit surveys, no nest found, lower use (0.02-0.05 per 20-minute survey) compared to Foote Creek Rim (Wyoming) (0.2 – 0.3 per 20-minute survey) and Altamont Pass (California) (0.2-0.3 per 20-minute survey)
Gyrfalcon	Likely, one observation during winter bald eagle surveys
Harlequin duck	Unlikely, occurs in fast-flowing mountain streams and marine shorelines, recorded in Kittitas County west of project area
Lewis' woodpecker	Likely, breeding possible in forests near project area, recorded in Kittitas County, one observation documented during surveys
Loggerhead shrike	Likely, possible breeding habitat includes shrub-steppe, shrubland, and agricultural, recorded in Kittitas County, one observation during winter bald eagle surveys as well as two unidentified shrike observations, not observed during spring and summer avian surveys
Long-billed curlew	Likely, one observation documented during surveys
Merlin	Likely, breeding possible within project area, two observations during spring and summer surveys, documented by WDFW
Northern goshawk	Likely, documented breeding north and west of project area, numerous WDFW records from mountains north and west of project area in coniferous and aspen forests, two observations outside of project area during fixed-point surveys

Table 3.2-4: Continued

Common Name	Potential Occurrence within Project Area
Northern spotted owl	Unlikely, appropriate habitat not present within project area, documented site centers north and west of project area
Olive-sided flycatcher	Possible, breeding in forested habitats, recorded in Kittitas County
Osprey	Likely, one observation during fixed-point surveys, one during in-transit surveys
Peregrine falcon	Unlikely, most records in Western Washington, possible transient or migrant
Pileated woodpecker	Unlikely within project area, possible in forests near project area, recorded in Kittitas County
Prairie falcon	Likely, five observations during spring surveys
Sage sparrow	Possible, breeding habitat includes sagebrush and shrubland, documented in southern and eastern Kittitas County
Sage thrasher	Likely, possible breeding habitat includes sagebrush and shrubland, documented in southern and eastern Kittitas County, one observation during fixed-point surveys
Turkey vulture	Likely, 25 observations during fixed-point surveys, 31 during in-transit surveys
Vaux's swift	Likely, possible breeding habitat includes varied habitats below alpine habitats, recorded in Kittitas County, two observations during fixed-point surveys
White-headed woodpecker	Unlikely within project area, breeding habitat possible in forests near project area, recorded in Kittitas County
Willow flycatcher	Possible, breeding habitat moist forested areas and riparian habitats, recorded in Kittitas County
Mammals	
Black-tailed jackrabbit	Possible, grassland and shrub habitats, records from southeast Kittitas County
Fisher	Unlikely, associated with mature coniferous forests, suitable habitat in western Kittitas County
Fringed myotis	Possible, varied habitats include forested or riparian habitats and shrubland, roosts in buildings and trees, hibernates in mines and caves, potential habitat throughout eastern two-thirds of Kittitas County
Gray wolf	Unlikely, unknown status in Washington but suitable habitat in North Kittitas County, WDFW records from 1992 and 1993 from L.T. Murray State Wildlife Recreation Area southwest of I-90
Grizzly bear	Unlikely, unknown status in Washington but suitable habitat in North Kittitas County, one WDFW record north of project area
Long-eared myotis	Unlikely, habitat primarily forested habitats and edges, juniper woodland, mixed conifers, and riparian areas, roosts in snags, crevices, bridges, buildings, and mines, potential habitat in western and northern Kittitas County
Long-legged myotis	Unlikely, habitat primarily coniferous and mixed forests and riparian areas, roosts in caves, crevices, buildings, and mines, potential habitat in western and northern Kittitas County
Merriam's shrew	Possible, sagebrush shrub and mesic grass/shrub habitats, records from southeast Kittitas County
Small-footed myotis	Possible, habitat varied arid grasslands and shrubland, and mixed forests, roosts in crevices and cliffs, hibernates in caves and mines, records from eastern Kittitas County
Townsend's big-eared bat	Unlikely, varied habitats but tends to prefer forested and riparian areas, hibernates in caves, no records from Kittitas County
Western gray squirrel	Unlikely, suitable habitat in northeast Kittitas County; WDFW records from south of I-90 in L.T. Murray State Wildlife Recreation Area
White-tailed jackrabbit	Possible, grassland and shrub habitats, recorded in northeast Kittitas County
Wolverine	Unlikely, generally associated with northern coniferous forest; suitable habitat in western Kittitas County, WDFW record from northeast of project area
Yuma myotis	Possible, closely associated with water in varied habitats, no records from Kittitas County

Table 3.2-4: Continued

Common Name	Potential Occurrence within Project Area
Amphibians and Reptiles	
Cascades frog	Unlikely, occurs in wet mountain meadows with ponds and potholes, records in western and northern Kittitas County
Columbia spotted frog	Possible, occurs in wetlands, marshy edges of ponds/lakes, documented throughout Kittitas County, two WDFW records north of project area
Larch Mountain salamander	Unlikely, found in lava talus slopes, recorded in western Kittitas County
Red-legged frog	Unlikely, species range moist forests, streams, and ponds, recorded in western Kittitas County
Sharptail Snake	Possible, found in stable talus slopes, damp/moist habitats, and forest edges, records from Kittitas County
Striped whipsnake	Possible, occurs in grasslands, sagebrush, and dry rocky canyons, records from eastern Kittitas County
Tailed frog	Unlikely, habitat fast-flowing permanent streams in forested areas, records in western and northern Kittitas County
Western toad	Possible, occurs in spring pools, ponds, lake shallows, slow moving streams and nearby uplands, documented in Kittitas County
Fish	
Bull trout	No, suitable stream habitat not present in project area, occurs in Yakima River and major tributaries
Chinook salmon	No, suitable stream habitat not present in project area, occurs in Yakima River and major tributaries
Interior redband trout	No, suitable stream habitat not present in project area, occurs in Yakima River and major tributaries
Mountain sucker	No, suitable stream habitat not present in project area, occurs in Yakima River and major tributaries
Pacific lamprey	No, suitable stream habitat not present in project area, occurs in Yakima River and major tributaries
Steelhead	No, suitable stream habitat not present in project area, occurs in Yakima River and major tributaries
Westslope cutthroat	No, suitable stream habitat not present in project area, occurs in Yakima River and major tributaries

Source: Sagebrush Power Partners LLC 2003a

3.2.3 Impacts of Proposed Action

This section describes the potential direct impacts on vegetation; wetlands; wildlife and habitat; fisheries; and threatened and endangered plant, wildlife, and fish species from development of the KVWPP. Direct impacts are associated with construction, operations, and decommissioning activities that affect these resources. Direct impacts include directly filling or grading areas of the listed resource types (e.g., wildlife habitat or wetlands) on the site. Direct impacts could be associated with any of the proposed project elements, including the wind turbines and meteorological towers, existing and new gravel access roads, additional power lines, and the proposed O&M facility and substations. Impacts associated with or attributable to specific project elements are discussed where applicable. For example, the potential for bird mortality at the project site is associated with turbine and meteorological tower collections. Potential impacts associated with the proposed project would be minimized or avoided through implementation of

the BMPs and mitigation measures as described in Section 3.2.5. Indirect impacts are not anticipated because the project is not expected to substantially induce regional growth to the extent that it would result in significant effects to offsite resources.

Construction Impacts

Table 3.2-5 summarizes potential construction impacts on vegetation, wetlands, wildlife, fisheries, and threatened and endangered species under the three project scenarios.

Table 3.2-5: Summary of Potential Construction Impacts: Vegetation, Wetlands, and Wildlife

	82 Turbines/3 MW (Lower End Scenario)	121 Turbines/1.5 MW (Middle Scenario)	150 Turbines/1.3 MW (Upper End Scenario)
Vegetation			
Temporary vegetation removal and habitat loss	231 acres disturbed area	311 acres disturbed area	371 acres disturbed area
Permanent vegetation removal and habitat loss[1]	118 acres disturbed area	93 acres disturbed area	95 acres disturbed area
Wetlands			
Impacts on wetlands	185 square feet disturbed	135 square feet disturbed	Same as middle scenario
Wildlife and Fisheries			
Impacts on wildlife species	Possible avoidance behavior, potential mortality less than the middle scenario	Possible avoidance behavior, potential mortality negligible or unlikely	Possible avoidance behavior, potential mortality greater than the middle scenario
Impacts on elk or mule deer	Same as middle scenario	Possible avoidance behavior	Same as middle scenario
Impacts on fish or fish habitat	Same as middle scenario	None	Same as middle scenario
Impacts on stream crossings[1]	1,245 square feet disturbed, negligible effects	1,041 square feet disturbed, negligible effects	Same as middle scenario
Threatened and Endangered Species			
Impacts on plant, fish, or wildlife species protected under ESA	Same as middle scenario	Unlikely	Same as middle scenario
Impacts on federal or state protected plant, fish, or wildlife species	Same as middle scenario	Negligible	Same as middle scenario

Source: Sagebrush Power Partners LLC 2003a, c, f.

1 The amount of permanent disturbed area of habitat and jurisdictional waters and wetlands is greatest for the lower end scenario because wider roads would be required to accommodate safe travel of larger cranes.

Vegetation

Impacts during construction at any of the proposed KVWPP facilities would involve direct disturbance to vegetation through heavy equipment, vehicle, and construction crew activities. The disturbances would include vegetation clearing, and digging, filling, grading, trenching, and compaction of soils. The extent of impact would depend on the type and quantity of affected

vegetation for each project scenario. Construction-related impacts on vegetation would be greatest under the upper end scenario, because this scenario would result in the largest amount of ground disturbance in the project area.

The predicted area of disturbance associated with project construction by vegetation community is based on preliminary design plans and project vegetation and habitat maps. Table 3.2-6 summarizes the temporary vegetation community impacts and Table 3.2-7 summarizes the permanent vegetation community impacts associated with the project. Data presented in the tables represent the maximum extent of clearing that would occur under each of the proposed project scenarios.

Total temporary habitat disturbance would range from 231 acres under the lower end scenario to 370 acres under the upper end scenario. Total permanent habitat disturbance would range from 93 acres under the middle scenario to 118 acres under the lower end scenario. Under the upper end scenario, 95 acres would be permanently disturbed.

Grassland, shrub-steppe, and sagebrush vegetation communities account for more than 98% of temporary impacts and more than 96% of permanent impacts associated with the clearing of vegetation. The remaining vegetation communities that would be disturbed, coniferous forest, deciduous shrub, and riparian habitat account for 0.2% of temporary impacts and less than 0.1% of permanent impacts on vegetation. Riparian impacts are discussed in further detail in the Fisheries section below. Developed areas account for 1.7% of temporary impacts and 1.6% of permanent impacts. Talus slopes located in the western portion of the project area are located outside the footprint of the project site and would not be disturbed during project construction. The ratio of habitat acreage affected would be the same under all three project scenarios.

It is estimated that 75% of the total area affected by project construction would only be temporarily disturbed (i.e., for less than one year), and would be replanted and restored after construction is finished. The remainder would continue to be occupied by project facilities (see Direct Operations and Maintenance Impacts below).

The lithosol sub-type shown on the habitat map (Figure 3.2-1) is a sub-category of the grassland, low sagebrush, and shrub-steppe cover types identified in Tables 3.2-6 and 3.2-7. Therefore, the impacts on the grassland, low sagebrush, and shrub-steppe cover types identified in Tables 3.2-6 and 3.2-7 include the lithosol sub-type. The estimated impact area of lithosol habitat is identified at the bottom of Tables 3.2-6 and 3.2-7. WDFW is concerned about project disturbance to lithosol soils because they are difficult to restore, sensitive, and may prove to be important in the life cycles in many animal species, including sage grouse (WDFW 2003b). Loss of this habitat type would be considered an adverse effect of the project but would be adequately mitigated with proposed and recommended mitigation measures identified in Section 3.2.5.

While the extent of lithosol habitat at the project site is defined and quantified, the regional extent of this habitat type is not quantitatively known. Therefore, it is difficult to assess the magnitude

of lithosol impacts at the project site within the context of the surrounding region. Specialized habitats such as lithosols occur throughout the region but it is unknown if project impacts would disproportionally affect this specific habitat type relative to its occurrence throughout the region.

Table 3.2-6: Temporary Vegetation Community Impacts

Vegetation Community	Lower End Scenario (acres)	Middle Scenario (acres)	Upper End Scenario (acres)
Dense Conifer	0.1	0.1	0.1
Deciduous Shrub Thicket	<0.1	<0.1	<0.1
Dense Shrub-Steppe	4.5	6.0	7.1
Moderate Shrub-Steppe	42.5	57.2	68.3
Sparse Shrub-Steppe	40.2	54	64.5
Low Sagebrush	21.1	28.4	33.9
Grassland	118.4	159.2	190.2
Riparian Tree	0.3	0.4	0.4
Riparian	<0.1	<0.1	<0.1
Developed	3.9	5.3	6.3
Totals	231.0	310.5	370.8
Lithosol impacts[1]	93.4	125.6	149.9

Source: Sagebrush Power Partners LLC 2003c.
Note: Totals may not sum due to rounding.
1 The lithosol sub-type shown on Figure 3.2-1 is a sub-category of the grassland, low sagebrush, and shrub-steppe cover types. The three cover types in the table do not separate the lithosol sub-category. Lithosol impacts were estimated as shown at the bottom of the table. The Applicant's consultants provided an estimate of lithosol impacts for the middle scenario. Potential lithosol impacts under the lower and upper end scenarios were estimated based on the ratio of lithosol impacts on cover type identified under the middle scenario. Lithosol impacts were estimated within the original 50-meter survey corridor, which does not cover the entire proposed impact footprint. The lithosol acreage given above likely understates the actual amount by approximately 10%. (Taylor, pers. comm., 2003).

Table 3.2-7: Permanent Vegetation Community Impacts

Vegetation Type	Lower End Scenario (acres)	Middle Scenario (acres)	Upper End Scenario (acres)
Dense Conifers	<0.1	<0.1	<0.1
Deciduous Shrub Thicket	<0.1	<0.1	<0.1
Dense Shrub-Steppe	3.1	2.4	2.5
Moderate Shrub-Steppe[1]	29.0	22.6	23.2
Sparse Shrub-Steppe	20.5	15.9	16.4
Low Sagebrush[2]	11.8	9.8	10.0
Grassland	51.7	40.3	41.4
Riparian Tree	<0.1	<0.1	<0.1
Riparian	0.0	0.0	0.0
Developed	1.8	1.5	1.5
Totals	118.0	92.5	95.0
Lithosol impacts[3]	36.4	28.5	29.3

Source: Sagebrush Power Partners LLC 2003c.
Note: Totals may not sum due to rounding.
1 Includes 1.8 acres of area where proposed facilities lie outside of the area delineated on the habitat cover type map. This only occurs along three small segments of an existing dirt road added to the project layout after the vegetation typing was complete. However, based on photos of the area and notes from the rare plant survey, it appears that most of these "Not Typed" acres would likely be typed as "Moderate Shrub-Steppe."
2 Permanent disturbance to low sagebrush habitat assumes disturbance of both the proposed Bonneville and PSE substation sites (3 acres each), therefore total acreage numbers have been adjusted accordingly.
3 The lithosol sub-type shown on Figure 3.2-1 is a sub-category of the grassland, low sagebrush, and shrub-steppe cover types. The three cover types in the table do not separate the lithosol sub-category. Lithosol impacts were estimated as shown at the bottom of the table. The Applicant's consultants provided an estimate of lithosol impacts for the middle scenario. Potential lithosol impacts under the lower and upper end scenarios were estimated based on the ratio of lithosol impacts on cover type identified under the middle scenario. Lithosol impacts were estimated within the original 50-meter survey corridor, which does not cover the entire proposed impact footprint. The lithosol acreage given above likely understates the actual amount by approximately 10%. (Taylor, pers. comm., 2003).

The use of heavy equipment on areas of temporary disturbance could cause soil compaction that may affect plant survival and growth after construction completion. Soil compaction might directly affect the soil characteristics suitable for native plant growth and might reduce the infiltration of water and nutrients into the soil.

Exposed, unvegetated, and/or compacted soils that result from land conversion may also be susceptible to colonization by invasive species if measures are not taken to reduce the establishment of these species. Clearing associated with new roads often provides routes for migration of weeds into previously weed-free areas. The severity of weed advancement would depend on a variety of factors, including the health and vigor of the existing vegetation; the timing and duration of clearing, reseeding, and replanting of cleared areas; and the weed species present in the vicinity. Implementation of proposed measures to control the introduction and spread of undesirable plants during construction would minimize potential adverse effects associated with invasive species (see Section 3.2.5, Mitigation Measures).

Potential impacts on vegetation and plant species of concern could occur as a result of increased dust associated with construction activities. For example, dust could have a seasonal effect on vegetation by coating plant leaves with particulate material. This potential impact would be greatest under the upper end scenario because it would result in the largest amount of ground disturbance. Implementation of appropriate dust control measures (see Section 3.11, Air Quality, Mitigation Measures section) would minimize potential adverse effects to project area vegetation. The short-term nature of project construction and implementation of the proposed invasive weed control program (see Section 3.2.5) would additionally mitigate for potential adverse indirect effects watering for dust control could have on native vegetation.

Project construction activities could also have the potential to ignite wildfires if precautions are not taken. Because it is not clear if wildfires would have a positive or negative effect on project area vegetation, the most prudent course of action would be to implement measures to maintain current fire frequency patterns.

Wetlands

Potential impacts on wetlands associated with construction of the proposed project include filling or grading of wetland systems. Only one of the identified potential wetland systems would be affected by proposed construction activity. Impacts on potential Wetland Area A-1 may involve up to 135 square feet due to proposed road and electrical collection system improvements under the middle and upper scenarios, and 185 square feet under the lower end scenario. The proposed PSE substation would be located upslope and to the west of Wetland S-1, approximately 700 feet distant; therefore, Wetland S-1 would not be affected by the project. Impacts on potential wetlands assume a road width corridor of 24 feet and a combined utility and road corridor width of 30 feet. For turbines larger than 1.5 MW (i.e., under the lower end scenario), roads would need to be 34 feet wide to safely accommodate larger cranes. Correspondingly, the area of affected wetland resources may be higher.

Wildlife and Habitat

Potential impacts on wildlife and wildlife habitat associated with construction of the proposed project includes removal and loss of habitat associated with clearing vegetation communities and noise associated with construction. The primary effect from project construction would be the fragmentation, alteration, and removal of wildlife habitat. Diversity and abundance of wildlife relate directly to the amount, type, and quality of habitat and its supply of forage, protective cover, and secure nesting/rearing areas. Removing forested habitat would create a corresponding adverse effect on the wildlife that inhabits the project area. Loss of snags and coarse woody debris negatively affects primary and secondary cavity nesters such as woodpeckers and chickadees. Removing the overstory adversely affects canopy-using mammals and birds and decreases thermal cover. Decreases in understory adversely affect ground-dwelling species. Loss of plant communities that generally offer less diverse wildlife habitat, such as dry grassland and shrub-steppe, would result in a lower adverse effect than loss of the more complex vegetation associations such as wetlands and forested areas.

Clearing vegetation for the proposed construction would eliminate and modify existing wildlife habitat. Such impacts on habitats would displace and/or eliminate wildlife that currently depend on this vegetation. Most wildlife species (such as birds, deer, or coyotes) would be able to move away from areas of disturbance. Wildlife populations are generally considered to be at or near carrying capacity in all habitat types (Krebs 1994; Morrison et al. 1992; Miller 1990; Robinson and Bolen 1989; Wallace 1987). Once vegetation has been removed, wildlife displaced into adjacent habitats may be unsuccessful in colonizing nearby suitable habitats because these areas are usually already occupied. The increased stress of competition for limited resources and susceptibility to predation may cause displaced animals to perish or to displace other individuals that in turn may perish. Upland game birds, passerines, hawks, small mammals, deer, elk, and reptiles currently using the project area would be adversely affected by this loss of habitat. Vegetation communities associated with construction areas of the project are unlikely to support populations of amphibian species.

Excavation could result in mortality of individuals in underground burrows. Ground-dwelling mammals would lose the use of permanently disturbed areas; however, they are expected to repopulate the temporarily disturbed areas. Because the turbine pad and road construction would occur in relatively narrow areas, most wildlife species would be able to move away from areas of disturbance during construction. Overall, loss of habitat would result in a decrease in wildlife diversity and abundance over existing conditions.

During construction, increased noise levels created by heavy machinery and blasting activity may affect wildlife in adjacent habitats by disrupting feeding and nesting activities. Increased noise levels created by heavy machinery and blasting could cause birds to abandon their nests and may displace wildlife. Construction activities could result in avoidance behavior by some wildlife species. Generally, wildlife species are more sensitive to noise disturbances during spring breeding activity and noise impacts could result in disrupted breeding activity or cause breeding

adults to abandon their young. As described above in the Affected Environment section, most of the avian species observed in the project area are foraging and/or migrating species and do not breed in the project area. Blasting would occur where required to loosen subsurface rock and facilitate excavation for the foundations of the wind turbines, meteorological towers, and substation equipment. Due to the rocky conditions at the site, most wind tower foundations are anticipated to require one to two blasts each. Blasting would occur during the excavation phase of construction, which would last for approximately two months for the lower end scenario and three months for the upper end scenario. All blasting activity would occur during the daytime. Many wildlife species, particularly mammals, are nocturnal and are relatively inactive during daylight hours. They typically retreat to burrows and other resting areas, and generally would not be affected by construction noise that occurs during the day. Once construction and blasting activities are complete, wildlife would likely inhabit available habitat, but likely to a lesser extent because of increased human disturbance associated with the turbines.

In the absence of systematic quantitative surveys, precise population densities of native wildlife are difficult to predict. Overall, loss of habitat would result in a decrease in wildlife diversity and abundance over existing conditions. Impacts on wildlife and habitat associated with proposed project construction, with implementation of the proposed mitigation measures, are not expected to result in a significant impact on native wildlife based on the following factors:

- Habitat types within the proposed project area are not regionally unique. Quantitative impacts on wildlife habitat, as shown on Tables 3.2-6 and 3.2-7, would not result in a significant loss of habitat relative to the amount of similar or higher quality habitat in Kittitas County and Eastern Washington.
- Wildlife species documented within the project area are generally relatively common and widespread in Kittitas County and Eastern Washington.

Elk and Mule Deer

During construction, elk and mule deer would likely avoid the site due to disturbance associated with construction equipment and other human activity. Most construction would take place during the summer months, minimizing construction disturbance to wintering big game. Construction-related disturbance is expected to be limited to the construction period time frame.

During project construction, quality wintering, calving, and migration corridor habitat typically associated with elk (river bottom, floodplain, riparian, and forested upland habitat) would not be disturbed.

The proposed project area occurs approximately 3 miles southeast of mapped elk calving areas. The proposed project would not impact the mapped calving area.

Fisheries

Potential impacts on fish or fish habitat associated with construction of the proposed project include impacts on water quality and changes in water quantity. Natural resource information does not identify any fish-bearing aquatic habitat within 0.5 mile of proposed construction activity. The nearest documented fish-bearing aquatic resources are the Yakima River, located more than 0.5 mile south of the project area and Swauk Creek located more than 0.5 mile west of the project area. Potential fish habitat within the project area is limited to stream channels in low topographic areas between ridges. These channels are narrow, shallow systems with intermittent flows and do not provide habitat for resident or anadromous fish. The characteristics of these channels would likely classify them as Type 5 Waters according to guidelines established in Chapter 222-16-030 of the WAC. Although fish habitat is not documented within 0.5 mile of the project area, general mitigation measures have been proactively developed associated with stream channel crossings and potential water quality and quantity impacts on minimize potential impacts on fish and fish habitat. In addition, mitigation measures and impacts would be further detailed and refined as the design phase proceeds prior to construction.

Water quality can be degraded by accidental spills of petroleum hydrocarbons from construction activities and exposure to construction waste, such as concrete wash water. Potential significant impacts due to erosion and sedimentation are not likely. Potential water quality impacts related to construction are expected to be short term and negligible with proper management. Section 3.3 Water Resources, contains more detailed information on water quality impacts.

Six potential stream channel crossings associated with the proposed project were identified (Table 3.2-2 and Figure 3.2-2). Construction activities associated with the project that would occur in low topographic areas between ridges include an aboveground collector cable and access roads. The aboveground access cable would not result in any disturbance to the stream channels or associated riparian habitat. As identified on Table 3.2-8, access roads associated with the project would cross three stream channels. Estimated permanently disturbed areas of impact associated with the proposed access roads are identified in Table 3.2-9. The estimated area of fill within the channels associated with project access roads was based on visual observations in the field (Sagebrush Power Partners LLC 2003c). The proposed project would not realign or substantially alter any stream channels. Because the proposed access roads associated with stream crossings do not vary between the different scenarios, potential impacts on stream channels would be the same under each of the upper end, middle, and lower end scenarios.

There would be no impacts associated with Streams I-1, G-1, and H-1. Proposed access roads would impact Streams I-2, J-1, and J-2 and their associated riparian habitat. Moving the potential crossings up or down the stream channels would not provide the opportunity to reduce impacts. A proposed access road would cross at Stream Crossing I-2. Impacts associated with Stream Crossing I-2 would not exceed 245 square feet of disturbance under the middle and upper end scenarios and 295 square feet under the lower end scenario. The proposed access road crossing associated with Stream J-1 would be in the same locations as an existing jeep trail that crosses the

stream channel. Total square footage impacts at this location would not be more than 196 square feet under the middle and upper end scenarios and 236 square feet under the lower end scenario. The proposed access road at the location of Stream Crossing J-2 would pass between the intermittent stream and a nearby property corner. Impacts associated with the two crossings at Stream J-2 would not exceed 600 square feet of disturbance under the middle and upper end scenarios and 714 square feet under the lower end scenario.

Table 3.2-8: Potential Stream Channel Crossings within the Project Area

Stream Channel	Comments
Stream I-1	Activities associated with the proposed project would not cross Stream I-1. The closest point from a proposed access road to Stream I-1 is 60 feet where the access road turns sharply to the right and goes up an existing road leading away from the stream to the southeast.
Stream G-1	Activities associated with the proposed project would not cross Stream G-1. A proposed access road would be approximately 260 feet upslope and to the south.
Stream H-1	Activities associated with the proposed project would not cross Stream H-1. A proposed access road would be located approximately 580 feet upslope from Stream H-1.
Stream I-2	Activities associated with the proposed project include an access road that would cross Stream I-2.
Stream J-1	Activities associated with the proposed project include an access road that would cross Stream J-1 in the same location as an existing jeep trail.
Stream J-2	Activities associated with the proposed project include an access road that would not cross Stream J-2 but would pass between Stream J-2 and the project area boundary.

Source: Sagebrush Power Partners LLC 2003c.

Table 3.2-9: Impacts at Potential Stream Crossings (square feet)

Stream	Lower End Scenario	Middle Scenario	Upper End Scenario
I-1	none	none	none
G-1	none	none	none
H-1	none	none	none
I-2	295	245	Same as middle scenario
J-1	236	196	Same as middle scenario
J-2	714	600	Same as middle scenario

Source: Sagebrush Power Partners LLC 2003i.

Impacts on potential streams assume a road width corridor of 24 feet under the middle and upper end scenarios. For turbines larger than 1.5 MW (i.e., under the lower end scenario), roads would need to be 34 feet wide to safely accommodate larger cranes. Correspondingly, the area of affected water resources may be higher.

No direct impacts on fish associated with construction of the proposed project would occur. With the mitigation and protection measures in place, no significant impact on surface water is anticipated under the proposed project. Potential impacts on the stream channels related to

construction are expected to be short term and negligible with proper management. The project site grading plan and roadway design would incorporate measures in line with the SWPPP and BMPs as described in Section 3.2.6, Mitigation Measures and in Section 3.3, Water Resources. The SWPPP and BMPs including silt fences, straw bales, and mulch would be used as necessary for clearing and construction to control erosion until the area can be stabilized with gravel or vegetation. Culverts would be designed and installed according to WDFW guidelines and according to Washington State Hydraulic Code guidelines. Where extensions or replacements of culverts occur, EFSEC would require a Hydraulic Project Approval (HPA) with WDFW review, for work that diverts, obstructs, or changes the natural flow or bed of any salt or fresh waters of the state (see Section 3.2.5, Mitigation Measures). The HPA would stipulate conditions for erosion and sedimentation control and for an allowable time period to complete any in-water work. The project would not adversely affect habitat associated with the Yakima River downstream of the project site.

Threatened and Endangered Species

Plant Species

Because no rare plant species were identified in the KVWPP project area, there would be no direct construction impacts on endangered plant species.

Wildlife and Fish Species

Birds

Bald eagle and northern spotted owl are the only bird species protected under the ESA identified as potentially occurring within the project area.

Northern spotted owl site centers and associated territory buffers are mapped by the WDFW approximately 0.5 mile north of the project area. Spotted owls occur almost exclusively within forested environments. Potential nesting habitat is not located within the project area. Although possible, it is unlikely that spotted owls would hunt within or disperse through the project area. Construction activity associated with the project would not impact northern spotted owl.

Bald eagle is documented as wintering, but not breeding, within the project area. Few bald eagles were observed within the project area during surveys. Most bald eagles observations were along the Yakima River and in areas where cattle are pastured. While use of the project area by bald eagles does occur, it is relatively low compared to adjacent areas along the Yakima River and appears to be related to the presence of livestock or wildlife carcasses, which they utilize for forage.

During project construction, the possibility of mortality effects to bald eagles is considered negligible and very unlikely to occur. Bald eagles in the area during the construction period are

unlikely to occur within the construction zones due to disturbances and therefore are unlikely to be at risk of construction-related mortality. In addition, the majority of construction is likely to take place during late spring, summer, and fall months when bald eagles occur very rarely or not at all in the area.

Ten bird species are identified as unlikely to occur due to limited potential habitat or because the project area is located outside the periphery of the known species distributions (Table 3.2-4). No breeding or foraging habitats associated with these ten species would be affected by construction of the proposed project under the upper end, middle, or lower end scenarios.

As shown on Tables 3.2-3 and 3.2-4 a variety of other bird species with federal or state protected status may occur in the project area based on the availability of suitable habitat (3 species) or their observed presence during surveys (13 species). Construction-related impacts on potential habitat for these 16 species would be greatest under the upper end scenario, because this scenario would result in the largest amount of ground disturbance in the project area. Many of these species may occasionally occur in the project area while hunting or migrating, but are unlikely to breed within the project area. During construction activities, the possibility of mortality effects to bird species is considered negligible and very unlikely to occur under the upper end, middle, or lower end scenarios.

Mammals

Several of the mammal species with federal or state protected status, such as, grizzly bear, gray wolf, wolverine, fisher, western gray squirrel, Townsend's big-eared bat, long-legged myotis, and long-eared myotis, are unlikely to occur within the project area due to habitat constraints and/or uncertain population status in Washington. No impacts on these species associated with construction of the project are likely to occur. Of these species, grizzly bear and gray wolf are federally listed species protected under the ESA.

White-tailed and black-tailed jackrabbits and Merriam's shrew have been documented within Kittitas County, and suitable habitat for these species is present in the project area. Some suitable habitat for these species would be lost to turbine pads and road construction. Overall, total impacts on habitat are relatively small and no significant impacts on these species are expected to occur associated with project construction.

Suitable foraging habitat for three bat species, fringed myotis, small-footed myotis and Yuma myotis, is present within the project area. Typical roosting habitat for these bat species (caves, cliffs, and crevices), is not located within the project area. Only general descriptions of potential distributions are available for these three species. Very little is known concerning the ecology of these three species, making it more difficult to accurately predict potential impacts on these species. These species would likely avoid construction activity associated with the project and no disturbance to roosting habitat would occur.

Amphibians and Reptiles

Field surveys conducted for the project did not specifically target reptiles or amphibians. All six amphibian species and both reptile species with federal or state protected status have been documented within Kittitas County. Suitable habitat for amphibians is very limited in the project area due to the lack of wetland habitat and streams with perennial flows. No significant impacts on protected amphibian species are expected to occur associated with project construction.

Construction activity associated with the project may affect protected reptiles (striped whipsnake and sharptail snake) through loss of habitat and direct mortality of individuals occurring in construction zones. The level of mortality associated with construction would be based on the abundance of these species on site. Some mortality may occur as reptiles retreat to burrows underground for cover or during periods of winter dormancy. Excavation for turbine pads, roads, or other wind project facilities could kill individuals in underground burrows. Above-ground snakes are generally mobile enough to escape construction activity.

Fish

Potential fish habitat for fish species with federal or state protected status is not located within the project area. No impacts on fish species associated with construction of the project would occur under the upper end, middle, or lower end scenarios.

Operations and Maintenance Impacts

Table 3.2-10 summarizes potential operations and maintenance impacts on vegetation, wetlands, wildlife and fisheries, and threatened and endangered species under the three project scenarios. No indirect impacts on vegetation, wetlands, wildlife and fisheries, or threatened and endangered species associated with operations and maintenance of the project would occur. Induced growth or increased regional development would not occur as a result of the proposed project. Public concern was raised during the EIS scoping process regarding the potential for indirect impacts on wildlife species resulting from the spread of noxious weeds and wildfires. As described below in Section 3.2.5, Mitigation Measures, protective measures would be implemented to reduce these potential indirect impacts.

Table 3.2-10: Summary of Potential Operations and Maintenance and Decommissioning Impacts: Vegetation, Wetlands, and Wildlife

Operations and Maintenance Impacts	82 Turbines/3 MW (Lower End Scenario)	121 Turbines/1.5 MW (Middle Scenario)	150 Turbines/1.3 MW (Upper End Scenario)
Vegetation			
Vegetation shading by wind turbines	Same as middle scenario	Negligible	Same as middle scenario
Dust generation	Same as middle scenario	Negligible	Same as middle scenario
Potential project area colonization by invasive species	118 acres disturbed area	93 acres disturbed area	95 acres disturbed area
Change in fire frequency patterns in project area	118 acres disturbed area	93 acres disturbed area	95 acres disturbed area
Wetlands			
Impacts on wetlands	Same as middle scenario	None	Same as middle scenario
Wildlife and Fisheries			
Impacts on wildlife associated with vehicle traffic	Potential mortality less than the middle scenario	Potential mortality negligible or unlikely	Potential mortality greater than the middle scenario
Impacts on wildlife associated with wind turbines	Potential mortality less than the middle scenario	Possible avoidance behavior, potential mortality	Potential mortality greater than the middle scenario
Impacts on elk or mule deer	Same as middle scenario	Possible temporary avoidance behavior	Same as middle scenario
Impacts associated with wildlife migration	Same as middle scenario	None	Same as middle scenario
Impacts on fish or fish habitat	Same as middle scenario	None	Same as middle scenario
Threatened and Endangered Species			
Impacts on plant, fish, or wildlife species protected under ESA	No impacts on plant or fish species, potential mortality to bald eagle less than the middle scenario	No impacts on plant or fish species, potential mortality to bald eagle	No impacts on plant or fish species, potential mortality to bald eagle greater than the middle scenario
Impacts on federal or state protected plant, fish, or wildlife species	No impacts on plant or fish species, potential mortality to wildlife species less than the middle scenario	No impacts on plant or fish species, potential mortality to wildlife species	No impacts on plant or fish species, potential mortality to wildlife species greater than the middle scenario
Decommissioning Impacts			
Vegetation impacts	Similar to but lower than those described for construction in Table 3.2-5	Similar to but lower than those described for construction in Table 3.2-5	Similar to but lower than those described for construction in Table 3.2-5
Wetland and impacts	Same as middle scenario	Unlikely	Same as middle scenario
Wildlife and habitat, fisheries, and threatened and endangered species habitat	Similar to but lower than those described for construction in Table 3.2-5	Similar to but lower than those described for construction in Table 3.2-5	Similar to but lower than those described for construction in Table 3.2-5

Source: Sagebrush Power Partners LLC 2003a, c, f.

Vegetation

Project operations and maintenance would result in permanent vegetation removal. The extent of impact would depend on the type and quantity of affected vegetation for each project scenario. Tables 3.2-6 and 3.2-7 identify the predicted areas of temporary and permanent disturbances during project construction by habitat type. Total permanent habitat disturbance would range from 93 acres under the middle scenario to 118 acres under the lower end scenario. Vegetation communities associated with the proposed project that would be cleared include grassland, shrub-steppe, sagebrush, deciduous shrub, riparian vegetation, and conifer forest (see Tables 3.2-6 and 3.2-7). Lithosol habitat is a sub-category of the grassland, low sagebrush, and shrub-steppe cover types. Loss of this habitat type would be considered a permanent adverse effect of project operations but would be adequately mitigated with proposed and recommended mitigation measures identified in Section 3.2.5.

Operation impacts on vegetation communities would include shading associated with the turbine towers, as well as impacts caused by increased dust generated by travel on graveled roadways, potential changes in fire frequency patterns, and potential introduction of invasive species. Although as many as 150 turbines would be constructed under the upper end scenario, there should be no noticeable effect from shading on the underlying vegetation under any of the three project scenarios. Similar to construction period effects, there would be dust associated with travel across gravel access roads that could have a seasonal effect on vegetation. This potential impact would be greatest under the lower end scenario, where the permanent roadway footprint would be 95 acres (as opposed to 67 acres under the middle and upper end scenarios). Predicted vehicle travel between the O&M facility and the individual turbines during project operations would be minimal because scheduled maintenance is typically performed only every six months on each turbine. Therefore, potential impacts on onsite vegetation would be expected to be negligible.

Project operation and maintenance activities have the potential to ignite wildfires in the project area if precautions are not taken. However, the Applicant proposes to implement measures to minimize the risk of wildfire during the operation phases of the project (see Section 3.2.5, Mitigation Measures). Implementation of these measures would protect project area vegetation during project operations and maintenance.

Project operations could also introduce invasive species to the site that in turn could alter the vigor of existing vegetation communities in the project area. New access roads could provide a route for migration of weeds into previously weed-free areas. As stated above, this potential impact would be greatest under the lower end scenario, where the permanent roadway footprint would be 95 acres. However, predicted vehicle travel between the O&M facility and the individual turbines during project operations would be minimal. With implementation of proposed measures to control the introduction and spread of undesirable plants during and after construction (see Section 3.2.5, Mitigation Measures), potential impacts on onsite vegetation would be expected to be negligible.

Wetlands

Potential impacts on wetlands resulting from operation of the proposed project are unlikely under the upper end, middle, and lower end scenarios. Project operations are not expected to have impacts on wetland resources if proper drainage, erosion-control plans, and stormwater management practices are implemented. The proposed design approach, operational procedures, mitigation measures, BMPs, and other pollution prevention measures described in detail in Section 3.3, Water Resources, would protect wetlands associated with the proposed project.

Wildlife and Habitat

Other than wildlife habitat affected by construction, operation of the proposed project is not expected to affect existing wildlife habitats. Potential impacts on wildlife species associated with operation of the proposed project include disturbance associated with vehicle traffic, avoidance of turbines, and collisions with turbines and meteorological towers. Noise levels associated with operation of the proposed project are anticipated to be within or equal to about 5 to 10 decibels of current ambient noise levels, which would not significantly disturb wildlife species in the project area.

Some mammal and reptile fatalities can be expected from vehicle traffic in the project area. Given the amount of residential development and the existing roads and disturbance within the project area (including US 97, which runs through the middle of the project area), disturbance levels after operation begins would not be greatly increased. Daily vehicle traffic is expected to increase from 28 to 40 daily trips (Section 3.10, Transportation). During project operations, travel on the new and upgraded private gravel access roads within the project site is expected to consist largely of weekly or less frequent trips to turbines in service vehicles for maintenance and repair activities (Sagebrush Power Partners LLC 2003a, Section 3.2.4). This impact would be expected to be greatest under the upper end scenario because it would consist of the largest number of turbines (150) that would require maintenance. The number of vehicle trips associated with ongoing operations and maintenance workers commuting to and from the O&M facility and substations on paved state and county roads would range from 28 daily trips under the lower end and middle scenarios to 40 daily trips under the upper end scenario. Impacts are expected to be low and not significant due to the relatively low increase in traffic volumes. Birds also would be affected, but to a lesser degree because of their aerial agility.

Turbine Avoidance

Avian avoidance behavior associated with wind power development has not been extensively studied in the United States. Most studies of turbine avoidance effects have been conducted in Europe, and most of the impacts have involved wetland habitats and groups of birds not common in this project area, such as waterfowl, shorebirds and waders. European studies of disturbance to breeding birds suggest negligible impacts. Disturbance effects were documented during only one study (Pedersen and Poulsen 1991). For most avian groups or species at other European wind

power projects, no turbine avoidance effects on breeding birds were observed (Karlsson 1983; Phillips 1994; Winkelman 1989; Winkelman 1990).

At a large wind power project on Buffalo Ridge, Minnesota, abundance of shorebirds, waterfowl, upland game birds, woodpeckers, and several groups of passerines was found to be significantly lower at survey plots with turbines than at plots without turbines. Turbine avoidance effects are likely due to the direct loss of habitat near the turbine for the turbine pad and associated roads. These results are similar to those of Osborn et al. (1998) who reported that birds at Buffalo Ridge avoided flying in areas with turbines. Also at Buffalo Ridge, Leddy et al. (1999) found that densities of male songbirds were significantly lower in grasslands containing turbines than in grasslands without turbines. Reduced avian use near turbines was attributed to avoidance of turbine noise and maintenance activities, and reduced habitat effectiveness due to the presence of access roads and large gravel pads surrounding turbines (Leddy 1996; Johnson et al. 2000a). Construction and operation of the Foote Creek Rim Wyoming wind power project did not appear to cause reduced use of the wind power project and adjacent areas by most avian groups.

Avoidance of wind power projects by raptors has not been documented at any U.S. wind power projects. Anecdotal evidence indicates that raptor use of the Altamont Pass, California wind resource area may have increased since installation of wind turbines (American Wind Energy Association 1995). Although avoidance by birds of wind power projects is not desirable, especially where important habitats may be limited, if other suitable habitats are available, one potential benefit of avian avoidance of turbines is the reduced potential for collision mortality to occur (Crockford 1992).

Based on the available information, it is probable that some turbine avoidance effects may occur to the grassland/shrub-steppe avian species occupying the project area. The extent of these effects and their significance is unknown and hard to predict. Avoidance by avian species is expected to range from several hundred feet to no avoidance behavior. Impacts on avian species would be considered low.

Operation of the proposed project would not affect raptor nests unless there were avoidance effects that caused raptors to not return to the nests close to the project site. Impacts would be considered low given the low density observed in close proximity to the turbines, and the species involved (red-tailed hawk).

Potential avoidance impacts are expected to be similar under each of the proposed project scenarios because within the project site the access roads, turbine strings, and associated facilities would occur within the same general footprint.

Turbine Collisions

Mortality rates from other wind power project studies were used to estimate raptor, passerine, and bat mortality rates associated with the proposed project (Sagebrush Power Partners LLC

2003a, Exhibit 11, 2003f). Actual raptor, passerine, and bat fatality rates described below and summarized on Table 3.2-11 may vary due to several variables, including the number of occupied nests near the project area after construction and other site-specific factors such as weather variables.

To date, research on wildlife mortality associated with wind power projects identifies the number of turbines as the most significant variable in estimating potential mortality rates. Generally, the more turbines in a given project, the higher the range of potential wildlife mortality associated with turbine collisions. While project variables such as turbine height and turbine blade sweep area are typically used in calculating potential mortality, these elements are not considered as significant as the number of turbines in estimating overall potential mortality. For example, raptor surveys, such as those performed for this project, typically document when eagles are observed flying within the general range of the turbine blade sweep area under the middle scenario. Potential mortality rates under the different project scenarios were then estimated based on the ratio of potential fatalities per turbine, per year.

Table 3.2-11: Summary of Projected Annual Mortality of Raptor, Passerine, and Bat Species Associated with Turbine and Meteorological Tower Collisions

Species Group	Lower End Scenario	Middle Scenario	Upper End Scenario
Turbine Collisions			
Raptors	3 to 4	5	6
Passerines	30 to 200	50 to 300	60 to 375
Bats	80 to 160	120 to 240	150 to 300
Meteorological Tower Collisions[1]			
Passerines	73	73	73

Source: Sagebrush Power Partners LLC 2003a and 2003f.

1 Only passerine mortality has been documented at other wind project studies associated with meteorological tower collisions.

Raptors

Based on the level of raptor use within the project area, raptor mortality is expected to be slightly higher compared to other wind projects with similar turbine types. American kestrels and red-tailed hawks account for most of the raptor use at the site, and are expected to be the species with the highest mortality. The potential exists for other raptor species to collide with turbines, including northern harrier, rough-legged hawk, bald eagle, and turkey vulture. However, the mortality risk associated with these species is expected to be lower than the risk for American kestrel and red-tailed hawk. Turkey vultures appear less susceptible to collision that most other raptors (Orloff and Flannery 1992). Few northern harrier fatalities and no rough-legged hawk or bald eagle fatalities have been observed at wind projects to date. Golden eagle use of the site is low relative to other wind sites and the mortality risk for golden eagles is also expected to be low.

Federal and state protected raptor species are also discussed in the Threatened and Endangered Species section below.

Raptor mortality at other wind generation projects has been low. The estimate of raptor mortality at the Foote Creek Rim wind project in Wyoming is the highest observed and is 0.03 raptors per turbine per year based on a three-year study of 69 turbines (Young et al. 2002). No raptor mortality was observed at the Vansycle wind project in Oregon during a one-year study and one raptor mortality was recorded over a four-year study at the Buffalo Ridge wind project (Erickson et al. 2001).

Based on raptor use estimates in the project area, potential raptor mortality associated with the proposed project is estimated at about 25% greater than at the Foote Creek Rim project, or 0.038 raptor fatalities a year per turbine (Young et al. 2002). Based on this assumption, under the upper end scenario (150 turbines), an average of six raptor fatalities per year is estimated to occur (Table 3.2-12). A corresponding reduction of mortality associated with turbine collisions would be expected under the middle scenario (121 turbines) and the lower end scenario (82 turbines). Under the middle scenario, an average of five raptor fatalities per year are estimated to occur, and under the lower end scenario an average range of three to four raptor fatalities per year are estimated to occur. Based on the raptor survey results, the majority of raptor fatalities are expected to be American kestrels and red-tailed hawks, the two most common raptor species documented in the project area.

Passerines

Passerines have been the most abundant avian fatality at other wind projects studied (Johnson et al. 2000a; Young et al. 2002; Erickson et al. 2001), often comprising more than 80% of the avian fatalities. Both migrant and resident passerine fatalities have been observed. Given that passerines make up the vast majority of the avian observations onsite, it is expected that passerines would make up the largest proportion of fatalities. Species most common to the study area would likely be most at risk, including western meadowlark, vesper sparrow and horned lark. Horned larks have been the most commonly observed fatality at several wind projects, including Vansycle and Foote Creek Rim (Erickson et al. 2001; Young et al. 2002). Nocturnal migrating species may also be affected, but it is not expected that they would be found in large numbers based on data collected at other wind power projects (i.e., no large mortality events documented [Erickson et al. 2000]). Based on the per turbine mortality estimates from the other wind power projects studied, between 50 and 300 passerine fatalities may occur per year under the middle scenario (121 turbines) (Table 3.2-12). Under the upper end scenario (150 turbines), approximately 215 passerine fatalities per year are estimated to occur with an estimated range of 60 to 375 fatalities. A corresponding reduction of mortality associated with turbine collisions, an estimated range of 30 to 200 fatalities passerine fatalities per year, would be expected under the lower end scenario (82 turbines).

Bats

It is likely that some bat fatalities would occur at the proposed project site. Bat research at other wind power projects indicates that bat species are at some risk of collision with wind turbines. Wind power project studies, as described below, indicate that most bat fatalities occur during migration, with low mortality associated with resident bat species. Most bat species in Washington migrate south in the fall. Washington bat species that do not migrate are year-round residents that hibernate in the winter. Most bat fatalities found at wind power projects have been tree-dwelling bat species, with hoary and silver-haired bats being the most prevalent fatalities. Both hoary bats and silver-haired bats are migratory species that may use the forested habitats near the project site and may migrate through the project area. Federal and state protected bat species are also discussed in the Threatened and Endangered Species section below.

At the Buffalo Ridge wind power project, Minnesota, based on a two-year study, bat mortality was estimated to be 2.05 bats per turbine per year (Johnson et al. 2000b). At the Foote Creek Rim wind power project, based on two years of study, bat mortality was estimated at 1.51 bats per turbine per year (Young et al. 2001). At the Vansycle Ridge wind power project in Oregon, bat mortality was estimated at 0.74 bats per turbine for the first year of operation (Erickson et al. 2000). Annual bat mortality associated with the project is estimated at 1 to 2 bat fatalities per turbine, or 150 to 300 bats under the upper end scenario (Table 3.2-12). A corresponding reduction of mortality associated with turbine collisions would be expected under the middle scenario (121 turbines) and the lower end scenario (82 turbines). Under the middle scenario, an average range of 120 to 240 bat fatalities per year are estimated to occur and under the lower end scenario an average range of 80 to 160 bat fatalities per year are estimated to occur. The significance of this impact is hard to predict because there is little information available regarding bat populations. Studies suggest that resident bats do not appear to be significantly affected by wind turbines (Johnson et al. 2002; Gruver 2002), since almost all mortality is observed during the fall migration period. Furthermore, hoary bat, which is expected to be the most common fatality, is one of the most widely distributed bats in North America. Pre-construction studies to predict impacts on bats may be relatively ineffective because current state-of-the-art technology for studying bats does not appear to be highly effective for documenting migrant bat use of a site (Johnson et al. 2002).

Other Avian Species

Some waterfowl mortality has been documented at other wind power projects (Erickson et al. 2001). However, studies at Foote Creek Rim, Vansycle, and Buffalo Ridge have not documented mortality of Canada geese, one of the most common waterfowl species observed flying over the project area. Because of the low use of the site by waterfowl, little mortality would be expected from operation of the project.

Other avian groups (e.g., upland game birds, shorebirds, and other migrants) occur in relatively low numbers within the project area and mortality would be expected to be low.

Meteorological Tower Collisions

Carcass search studies at the Foote Creek Rim wind power project, Wyoming, have found avian casualties associated with guyed meteorological towers. Based on searches of five permanent meteorological towers at Foote Creek Rim over a three-year period, it was estimated that these towers resulted in approximately 8.1 avian casualties per tower per year (Young et al. 2002). The vast majority of these avian casualties were passerines. Nine permanent meteorological towers are proposed for the project under each of the three scenarios. These towers would be expected to result in collision deaths for passerines at the site. The use of bird flight diverters on guy wires should reduce the risk of collision.

Elk and Mule Deer

The WDFW has expressed some concern over the potential effects of wind project development on wintering big game. Winter is a crucial period of time for the survival of many big game species. As deer expend more energy than they take in, body condition gradually declines throughout the winter (Short 1981). Unnecessary energy expenditures may increase the rate at which body condition declines, and the energy balance determining whether a deer would survive the winter is thought to be relatively narrow, especially for fawns (Wood 1998). Overwinter fawn survival may decrease in response to human activity or other disturbances (Stephenson et al. 1996). Roads and energy development may also fragment otherwise continuous patches of suitable habitat, effectively decreasing the amount of winter range available for big game. Fragmentation of habitat also may limit the ability of big game populations to move throughout the winter range as conditions change, causing big game to utilize less suitable habitat (Brown 1992).

Two published studies of big game winter use may be relevant to the development of wind turbines and wintering deer and elk (Rost and Bailey 1979; Van Dyke and Klein 1996). Van Dyke and Klein (1996) documented elk movements through the use of radio telemetry before, during, and after the installation of a single oil well within an area used year-round by elk. Drilling activities during their study ceased by November 15; however, maintenance activities continued throughout the year.

Elk showed no shifts in home range between the pre- and post- drilling periods; however, elk shifted core use areas out of view from the drill pad during the drilling and post drilling periods. Elk also increased the intensity of use in core areas after drilling and slightly reduced the total amount of range used. It was not clear if the avoidance of the well site during the post-drilling period was related to maintenance activities or to the use of a new road by hunters and recreational users. The authors concluded that if drilling activities occupy a relatively small amount of elk home ranges, that elk are able to compensate by shifting areas of use within home ranges.

While several authors have documented elk avoiding roads within forested environments during the summer, the effects of roads and associated human activity on wintering elk and mule deer have not been well documented. Rost and Bailey (1979) found that wintering mule deer and elk avoided areas within 600 feet of roads in eastern portions of their Colorado study area, where presumably greater amounts of winter habitat were present. Road avoidance was greater where roads were more traveled. Only mule deer showed a clear avoidance of roads in the western portion of their study area, where winter range was assumed to be more limiting. Mule deer also showed greater avoidance of roads in shrub habitats versus more forested areas. The authors concluded that impacts of roads depended on the availability of suitable winter range away from roads, as well as the amount of traffic associated with roads.

There is little information regarding wind project effects on big game. At the Foote Creek Rim wind project in Wyoming, pronghorn observed during raptor use surveys were recorded year round (Johnson et al. 2000). The mean number of pronghorn observed at the six survey points was 1.07 prior to construction of the wind power project and 1.59 and 1.14 per survey the two years immediately following construction, indicating no reduction in use of the immediate area. Mule deer and elk also occurred at Foote Creek Rim, but their numbers were so low that meaningful data on wind power project avoidance could not be collected.

The elk and mule deer in the project area primarily occupy the grassland and shrub-steppe habitats and riparian corridors. Following completion of the wind power project, the disturbance levels from construction equipment and humans would diminish and the primary disturbances would be associated with operations and maintenance personnel, occasionally vehicular traffic, and the presence of the turbines and other facilities.

Due to the lack of knowledge regarding the potential impacts of wind energy development on big game, it is difficult to predict with certainty the effects of the proposed wind project on mule deer and elk. Van Dyke and Klein (1996) showed wintering elk shifted use of core areas out of view of human-related activities associated with an oil well and access road. Most turbines and roads in the project area would be located on ridges and would be visible over a fairly large area. Where wind turbines would be constructed in elk wintering areas, elk may concentrate use away from the wind development during construction. While human-related activity at wind turbines during regular maintenance would be less than during the construction period, it is not known if human activity associated with regular maintenance activity would exceed tolerance thresholds for wintering elk. If tolerance thresholds during regular maintenance activities are exceeded, elk are likely to permanently utilize areas away from the wind development. Given the amount of disturbance within the project area associated with residential development and existing roads, including US 97 which runs through the middle of the project area, disturbance levels after facility operation begins would not be greatly increased. As described above in the wildlife and habitat section and shown in the traffic analysis (Section 3.10) the proposed project would add an estimated 28 to 40 additional daily commuter trips on local public roads to an area that averages more than 2,000 daily trips.

Seasonal sport hunting of big game is allowed within portions of the project area. Under the proposed project, public safety concerns may result in restricting public hunting within portions of the project area (see Section 3.6, Land Use and Recreation). Big game currently deterred from using the project area because of human disturbance might occupy the area if hunting at or near the project site is eliminated. Unhunted big game populations can habituate to human activities. This is a concern of WDFW because landscaping in developed areas might be attractive to big game during periods of winter stress, especially if big game hunting is eliminated. WDFW is the agency responsible for animal damage control claims caused by deer and elk. When deer and/or elk cause damage to private property, hunting season adjustments are an effective management tool for WDFW to control the size and location of big game populations. If big game damage to private property does occur in the project vicinity, restricting public hunting within the project area would limit WDFW's management options.

The proposed wind facility occurs approximately 3 miles southeast of mapped elk calving areas. The proposed project is not likely to impact the mapped calving area.

Wildlife Migration

No impacts are expected from the project to big game or reptile and amphibian movement or migration. The Quilomene elk migration corridor is outside the project area and no project features or construction would occur within the area identified as this migration corridor. Additionally, no wetlands would be affected that could impede amphibian movements. Migrant birds and bats may be at risk of collision with turbines in the project. Potential impacts on birds and bats are discussed in the Turbine Collision section above.

Fisheries

Operation activities associated with the proposed project that could potentially impact fisheries include stormwater, water use, and wastewater. Potential impacts on fish or fish habitat resulting from operation of the proposed project are unlikely under the upper end, middle, and lower end scenarios due to the absence of potential fish habitat in the proposed project area. Water resources within the proposed project site are limited to intermittent stream channels and wetland habitat with no known fish use. Operation of the project would have no impacts on fish and fish habitat downstream of the project site (Yakima River) if proper drainage, erosion control plans, and stormwater management practices are implemented. The proposed design approach, operational procedures, mitigation measures, BMPs, and other pollution prevention measures described in detail in Section 3.3 would protect water quality associated with the proposed project and freshwater habitat downstream of the proposed project site.

The quantity and quality of stormwater runoff could be affected by operation of the proposed project because of the increase in impervious surfaces, which could result in impacts on fisheries habitats downstream of the project site, if not mitigated. Stormwater from new impervious surfaces associated with the proposed project would be collected and diverted into detention and

treatment facilities. No component of the proposed project would be built near fish-bearing aquatic resources and no storm or other surface water would be discharged directly to fish-bearing aquatic resources. Based on the mitigation methods that would be implemented and the distance between the proposed project and the Yakima River downstream of the project site, effects on the Yakima River associated with stormwater runoff are unlikely.

A SWPPP would be developed in accordance with BMPs and would detail the sediment and erosion control measures and accidental spill prevention and control measures. The BMPs would be implemented, inspected, and maintained to minimize the potential for adversely affecting downstream water quality. These may include such things as silt fencing and hay bales, and placement of polyethylene tarps to cover exposed surfaces. Control of fuel storage and equipment fueling operations for spill prevention and control would be detailed in the SWPPP. Stormwater impacts and management are discussed in additional detail in Section 3.3, Water Resources.

Threatened and Endangered Wildlife Species

Birds

It is unlikely that spotted owls would hunt within or disperse through the project area. Operation activity associated with the project under the upper end, middle, or lower end scenarios would not impact northern spotted owl.

Based on the available information about bald eagle use of the site, potential bald eagle mortality due to operation of the wind power project would be confined to the winter and early spring seasons. Bald eagles would not be at risk from the wind power project in the summer or fall. Bald eagles are not expected to frequently occur within the wind power project area and operation of the wind power project should have minimal disturbance on bald eagles under either the upper end, middle, or lower end scenarios. Additionally, proposed mitigation measures are intended to further reduce the possibility of disturbance or displacement.

Because there have been no documented bald eagle fatalities to date at wind power projects (Erickson et al. 2001), potential bald eagle mortality estimates based on other wind power projects could not be calculated. Estimates of bird mortality from wind projects may be based on bird use of a site and the propensity for that species to fly within the rotor swept area or zone of risk. Seven observations of bald eagles were documented during standardized point counts across the project area (Sagebrush Power Partners LLC 2003a, Exhibit 12). Two of these observations were made in areas outside the proposed development. Thirty-three percent of eagles observed within the project site were flying within the zone of risk. While the sample size is relatively small, it does show that wintering bald eagles may have some exposure to turbines by flying within the rotor swept area. While potential bald eagle mortality estimates could not be calculated based on existing information, potential fatalities associated with turbine collisions would be highest under the scenario with the most turbines, the upper end scenario (150 turbines). A

corresponding reduction of potential mortality would be assumed under the middle (121 turbines) and lower end scenarios (82 turbines).

As described above, there have been no bald eagle fatalities documented at other wind power projects in the United States. Although the risk is low, the potential exists for bald eagle fatalities during operation of the project. The status of bald eagle in the project area is not expected to change due to the project. Bald eagle populations appear to be generally increasing and the USFWS has proposed the species for delisting (USFWS 1999). Bald eagle populations in Kittitas County, as with greater Washington and throughout North America, would continue to increase during and after the project is constructed.

During operation activities, the possibility of mortality effects to federal and/or state protected bird species is considered very low or negligible. Thirteen bird species with federal or state protected status were observed during the 2002 wildlife surveys (Table 3.2-4). Table 3.2-12 presents documented fatalities at other U.S. wind project sites of these 13 federal and/or state protected bird species.

Table 3.2-12: Summary of Fatalities at Operating Wind Power Projects in the United States of Federal and State Protected Bird Species Observed during 2002 Project Area Wildlife Surveys

Common Name	2002 Survey Results
Bald eagle	No bald eagle fatalities documented at any U.S. wind project
Loggerhead shrike	One fatality observed each at Altamont Pass and Tehachapi Pass (California)
Northern goshawk	No fatalities documented at any U.S. wind project
Golden eagle	One golden eagle was killed during two years of monitoring at the Foote Creek Rim Phase I and II facility
Lewis' woodpecker	Observed as a fatality at Vansycle in 1999
Long-billed curlew	No fatalities documented at any U.S. wind projects
Merlin	No fatalities have been reported at U.S. wind projects
Gyrfalcon	No fatalities documented at U.S. wind projects
Osprey	No fatalities documented at U.S. wind projects
Prairie falcon	One fatality documented at Foote Creek Rim (Wyoming), two at Altamont Pass (California), one at Montezuma Hills, and one at Tehachapi Pass (California)
Sage thrasher	No fatalities documented at any U.S. wind project
Turkey vulture	A few fatalities observed at U.S. wind projects, but apparently not very susceptible to collision due to foraging and scavenging behavior
Vaux's swift	No fatalities documented at any U.S. wind project

Source: Sagebrush Power Partners LLC 2003a, Exhibit 11.

Mammals

No impacts on grizzly bear, gray wolf, wolverine, fisher, western gray squirrel, Townsend's big-eared bat, long-legged myotis, and long-eared myotis associated with operation of the project are likely to occur under the upper end, middle, or lower end scenarios.

Some individuals of white-tailed and black-tailed jackrabbits and Merriam's shrew could be killed by vehicles on roads. Limits on vehicle speeds within the project area would minimize the potential for road kills. Overall, impacts associated with operation of the project to these species under the upper end, middle, or lower end scenarios should be minimal due to the limited nature of traffic expected within the project area.

Suitable foraging habitat for three bat species, fringed myotis, small-footed myotis, and Yuma myotis, is present within the project area. Roosting habitat for these bat species, such as caves, cliffs, and crevices, is not located within the project area. Only general descriptions of potential distributions are available for these three species. Very little is known concerning the ecology of these three species, making it difficult to accurately predict potential impacts on these species. Impacts on bats are discussed in greater detail in the Wildlife and Habitat section above. Documented fatalities of these species at wind projects within the United States were not identified during the analysis for the project.

Amphibians and Reptiles

As described above in the Construction Impacts discussion, suitable habitat for amphibians is very limited in the project area due to the lack of wetland habitat and streams with perennial flows. No significant impacts on protected amphibian species are expected to occur associated with operation of the project under the upper end, middle, or lower end scenarios.

Operations and maintenance activities may occasionally result in a road-killed striped whipsnake or sharptail snake. This is expected to be a rare occurrence due to the limited nature of traffic expected within the project area.

Fish

As described above in the Construction Impacts discussion, potential fish habitat for fish species with federal or state-protected status is not located within the project area. No impacts on fish species associated with operation of the project would occur under the upper end, middle, or lower end scenarios.

Decommissioning Impacts

Vegetation

Impacts on vegetation from decommissioning the project would be similar to but should be lower than impacts identified for construction, assuming that all access roads remained in place. Decommissioning vehicles would travel on established roadways, which would not impact vegetation, except for the possible introduction and/or spread of noxious weeds. Vegetation around project facilities (i.e., turbine, meteorological, and transmission towers) to be removed would likely be affected to the same extent as described for construction.

Foundations would be removed to a depth of 3 feet below grade and unsalvageable material would be disposed of at authorized sites. The soil surface would be restored as close as reasonably possible to its original condition. If the overhead power lines could not be used by the utility, all structures, conductors, and cables would be removed. The Applicant proposes to leave the underground electrical collection system in place subject to landowner approval. At the time of decommissioning, the Applicant would consult with the applicable landowner(s) to determine the appropriate disposition of the O&M facility (Taylor, pers. comm., 2003). Reclamation procedures would be based on site-specific requirements and techniques commonly used at the time the area would be reclaimed and would include regrading, adding topsoil, and revegetating all disturbed areas with native plant species.

Wetlands

Potential impacts on wetlands resulting from decommissioning of the proposed project are unlikely.

Wildlife and Habitat, Fisheries, and Threatened and Endangered Species

Impacts on wildlife and habitat, fisheries, and threatened and endangered species from decommissioning the proposed project would be lower than those for construction, assuming that all access roads remain in place. Dismantling the project would eliminate avian mortality caused by the presence of wind turbines. Wildlife habitat would have the potential to return to pre-project conditions over time; therefore, impacts from decommissioning would be low. Vehicles would travel on established roadways, which would not impact habitat for federal or state protected species. Mitigation for impacts on wildlife would follow procedures in use at the time of decommissioning.

3.2.4 Impacts of No Action Alternative

Under the No Action Alternative, the project would not be constructed or operated. However, development of a different nature could occur under Kittitas County's existing Comprehensive Plan and zoning regulations for the project area. Depending on the location, type, and magnitude of future development at the project site, impacts on vegetation, wetlands, or to threatened or endangered plant and animal species could be similar to or even greater than the proposed action. However, potential impacts on birds would be expected to be less under the No Action Alternative assuming that no tower-like structures are constructed.

Other power generation facilities would be constructed and operated in the region to meet the long-term need for power, most likely a gas-fired combustion turbine. Constructing a gas-fired turbine generator, developing and extracting natural gas, and constructing natural gas pipelines to provide fuel to the generating facility could create impacts on vegetation, wetlands, wildlife, and threatened and endangered species. The significance of such impacts would depend on the site-specific location and design of the facility.

3.2.5 Mitigation Measures

Mitigation Measures Proposed by the Applicant

Thorough Study and Analysis to Avoid Impacts

The Applicant has commissioned extensive studies by qualified biologists of plants and animals at the project site to avoid impacts on sensitive populations. These studies include:

- Rare plant surveys,
- Habitat mapping,
- Avian use point count surveys,
- Aerial raptor nest surveys,
- Wintering bald eagle surveys,
- Non-avian wildlife surveys,
- Biological assessment for threatened and endangered species, and
- Stream and wetland surveys.

The results and recommendations of these studies have been incorporated into the proposed design, construction, operation, and mitigation for the project.

Project Design Features to Avoid and/or Minimize Impacts

The proposed design of the project incorporates numerous features to avoid and/or minimize impacts on plants and wildlife. These features are based on site surveys, experience at other wind power projects, and recommendations from consultants performing studies at the site. Features of the project that are designed to avoid or minimize impacts on plants and animals include:

- Avoiding when possible, construction in sensitive areas such as riparian zones, wetlands, forests, etc.
- Minimizing new road construction by improving and using existing roads and trails instead of constructing new roads.
- Choosing underground (vs. overhead) electrical lines wherever feasible to minimize perching locations and electrocution hazards to birds.
- Choosing turbines with low rotations per minute and using tubular towers to minimize risk of bird collision with turbine blades and towers.
- Using bird flight diverters on guyed permanent meteorological towers or using unguyed permanent meteorological towers to minimize potential for avian collisions with guy wires.
- Equipping all overhead power lines with raptor perch guards to minimize risks to raptors.
- Spacing all overhead power line conductors to minimize potential for raptor electrocution.

Construction Techniques and BMPs to Minimize Impacts

Constructing the project has the potential to impact both habitat and wildlife in a variety of ways. The Applicant proposes using construction techniques and BMPs to minimize these potential impacts. These include the following:

- Using BMPs to minimize construction-related surface water runoff and soil erosion.
- Using certified "weed free" straw bales during construction to avoid introduction of noxious or invasive weeds.
- Flagging sensitive habitat areas (e.g., raptor nests, wetlands, etc.) near proposed areas of construction activity and designation of such areas as "off limits" to all construction personnel.
- Developing and implementing a fire control plan, in coordination with local fire districts, to minimize risk of accidental fire during construction and respond effectively to any fire that does occur.
- Establishing and enforcing reasonable driving speed limits during construction to minimize potential for road kills.
- Properly storing and managing all wastes generated during construction.
- Requiring construction personnel to avoid driving over or otherwise disturbing areas outside the designated construction areas.
- Monitoring raptor nests on site for activity prior to construction and modifying construction timing and activities to avoid impacts on nesting raptors.
- Designating an environmental monitor during construction to monitor construction activities and ensure compliance with mitigation measures.

Post-Construction Restoration of Temporarily Disturbed Areas

The following measures would be taken to restore temporarily disturbed areas after construction:

- All temporarily disturbed areas would be reseeded with an appropriate mix of native plant species as soon as possible after construction is completed to accelerate the revegetation of these areas and to prevent the spread of noxious weeds.
- The Applicant would consult with WDFW regarding the appropriate seed mixes for the project area.

Noxious Weed Control

Because noxious weeds can have numerous detrimental effects on rare plant populations, measures would be implemented to control the introduction and spread of undesirable plants during and after construction. Noxious weed control measures include:

- Cleaning construction vehicles prior to bringing them into the project area from outside areas.
- Quickly revegetating habitats temporarily disturbed during construction.

- Actively controlling noxious weeds that have established themselves as a result of the project.
- Developing a noxious weed control plan prior to construction, and implementing the plan over the life of the project as mitigation.

Dust Control

The Applicant has proposed to implement a comprehensive dust control program. See Section 3.11, Air Quality, for a detailed description of mitigation measures to minimize fugitive dust emissions from construction-related traffic and additional wind-blown dust as a result of ground disturbance.

Fire Protection

Prior to construction, a comprehensive fire control plan would be developed, and implemented project-wide over the life of the project. The fire control plan would take into account the dry nature of the region, and address risks on a seasonal basis. See Section 3.4, Health and Safety, for a detailed description of mitigation measures to minimize or prevent the risk of fire and explosion at the project site during both project construction and operations.

Monitoring and Adaptive Management

The Applicant proposes to convene a Technical Advisory Committee (TAC) to evaluate the mitigation and monitoring program and determine the need for further studies or mitigation measures. The TAC would be composed of representatives from WDFW, USFWS, Kittitas County, local interest groups (e.g., Kittitas Audubon Society), project landowners, and the Applicant. The role of the TAC would be to coordinate appropriate mitigation measures, monitor impacts on wildlife and habitat, and address issues that arise regarding wildlife impacts during construction and operation of the wind power project. The post-construction monitoring plan would be developed in coordination with the TAC and approved by EFSEC prior to construction.

The TAC would evaluate the mitigation and monitoring program and determine the need for further studies and mitigation measures in accordance with the *Wind Project Habitat Mitigation Draft Guidance Document* (WDFW 2003a). Based on a verbal agreement by the Applicant and WDFW coordinated in July 2003, three years of monitoring studies to evaluate impacts from project operations should occur. At the conclusion of these studies, an evaluation should be conducted with further mitigation measures determined, if needed.

Acquisition and Enhancement of Onsite Habitat

The Applicant proposes to purchase and protect, for the life of the project, a large area of habitat in the project area. This privately owned parcel, approximately 550 acres in size, is between proposed turbine strings B and C (Sections 22 and 27, Township 19 North, Range 17 East, WM)

and is adjacent to land owned by the Washington DNR. The Applicant proposes to purchase this parcel and implement measures to enhance its value as habitat. Based on an agreement by the Applicant and WDFW, the Applicant proposes to protect and restore replacement habitat for habitat temporarily and permanently disturbed by the project. Proposed mitigation ratios and replacement acres of habitat for the middle scenario are identified in Table 3.2-13 The same replacement ratio would apply under the lower and upper end scenarios.

Based on data provided, WDFW has determined that the proposed mitigation site would provide adequate mitigation for the impacts on wildlife habitat that are expected to result from the proposed project (WDFW 2003f).

Overall, the parcel is in fair to good condition. However, several opportunities for enhancement exist that would be expected to raise habitat quality further. Primary among these is management and control of cattle grazing within the entire parcel, and especially within the riparian zone. A grazing management plan could be developed that reduces or eliminates cattle pressure on the most sensitive portions, and allows for re-establishment of native vegetation in specific problem areas.

Although high concentrations of noxious weeds were not found within the parcel, scattered patches and individuals (primarily diffuse knapweed [*Centaurea diffusa*]) are present throughout. An overall noxious weed control effort for the parcel, developed in coordination with the Kittitas County Noxious Weed Control Board, would likely be effective at reducing or eliminating noxious weeds from the site, increasing the habitat quality and effectiveness.

Replanting shrubs in the burned area on the western ridgetop of the proposed mitigation parcel could hasten the re-establishment of vegetative structure in that area and reduce non-native species encroachment. In addition, implementing riparian replanting designed to re-establish native species would benefit certain problem areas along the unnamed creek in the mitigation parcel.

Loss of Wetlands and Streams

In August 2003, the Applicant submitted a JARPA to the U.S. Army Corps of Engineers and other applicable resource agencies to mitigate for the project's expected minor loss of jurisdictional wetlands and waters of the United States. The Corps issues Nationwide Permits that authorize minimal project impacts on wetlands and waters. NWP 12 addresses Utility Line Activities and specifically addresses utility lines and access roads. NWP 14 addresses Linear Transportation Projects and crossings of waters of the state by roadways. Both permits provide acreage limits of not greater than one-half-acre (21,779 square feet). There are some differences

Table 3.2-13: Proposed Mitigation Ratios and Replacement Acres of Habitat under the Middle Scenario (Acres)

Vegetation Type	Permanently Disturbed Area[1]	Permanent Mitigation Ratio	Permanent Mitigation Area[1]	Temporarily Disturbed Area	Temporary Mitigation Ratio	Temporary Mitigation Area	Total Mitigation Area Needed	Total Mitigation Area Provided
Dense Conifers	<0.1	2:1	0.0	0.1	0.5:1	0.1	0.1	0.0
Deciduous Shrub Thicket	<0.1	2:1	0.1	0.0	0.5:1	0.0	0.1	2.8
Dense Shrub-Steppe	2.4	1:1	4.8	6.0	0.5:1	3.0	7.8	0.0
Moderate Shrub-Steppe	22.6	2:1	45.2	57.2	0.5:1	28.6	73.8	274.9
Sparse Shrub-Steppe	15.9	2:1	31.9	54.0	0.5:1	27.0	58.8	73.1
Low Sagebrush	9.8	2:1	19.6	28.4	0.5:1	14.2	33.8	0.0
Grassland	40.3	1:1	40.3	159.2	0.1:1	15.9	56.2	185.1
Riparian Tree	<0.1	2:1	0.0	0.4	0.5:1	0.2	0.2	8.0
Riparian	0.0	2:1	0.0	0.0	0.5:1	0.0	0.0	0.0
Developed	1.5	0:1	0.0	5.3	0.0:1	0.0	0.0	0.0
Totals	92.5		141.8	310.5		88.9	230.7	543.9

1 Permanent disturbance to low sagebrush habitat assumes disturbance of both the proposed Bonneville and PSE substation sites (3 acres each); therefore, total acreage numbers have been adjusted accordingly.

in the requirements for these two different permits, and the Corps would make the determination of which NWP to apply for the proposed project. EFSEC would provide Section 401 water quality certification to the Corps if the project is approved by the Governor. Depending on the total project impacts and which NWP the Corps assigns, EFSEC may require compensatory mitigation for the project. Therefore, the specific mitigation requirements to compensate for loss of wetlands and water resources at the project site is considered an issue of uncertainty that has yet to be resolved.

Additional Recommended Mitigation Measures

Post-Construction Restoration of Temporarily Disturbed Areas

Existing project design minimizes both permanent and temporary impacts from facilities construction. The Applicant proposes to reseed temporarily disturbed areas with an appropriate mix of native plant species as soon as possible after construction is completed (see Mitigation Measures Proposed by the Applicant, above). WDFW recommends that a broadcast application (4 to 6 pounds per acre) of a lithosol origin biotype such as native Sandberg Bluegrass should be applied to restored areas (WDFW 2003e).

Acquisition and Enhancement of Onsite Habitat

WDFW has encouraged the Applicant to avoid and minimize the impact on lithosols as much as possible (WDFW 2003b). As described above, lithosol habitat is difficult to restore. In addition to the direct avoidance measures identified above, the following measure is recommended to minimize impacts on this unique and sensitive habitat:

- Implement measures to protect and restore existing lithosol habitat along ridgetops in the mitigation parcel. The amount of area required to mitigate for temporary and permanent loss of lithosol habitat should be determined based on further consultation with WDFW. If the appropriate amount of lithosol habitat is not identified at the mitigation parcel, additional lithosol habitat should be identified and acquired for preservation.

Lighting

The following mitigation measures to reduce lighting effects on avian species are recommended by WDFW (WDFW 2003e):

- The use of lights on towers, in accordance with federal, state and local requirements, should be minimized whenever possible, because they may attract birds and bats to the vicinity of the turbines in certain conditions (WDFW 2003d). Further, the USFWS recommends that only white (preferable) or red strobe lights be used at night, and that these should be the minimum number, minimum intensity, and minimum number of flashes per minutes (longest duration between flashes) allowable by the FAA. The use of solid red or pulsating red

warning lights at night should be avoided, wherever possible. Current research indicates that solid or pulsating (beacon) red lights attract night-migrating birds at a much higher rate than white strobe lights (USFWS 2003).

3.2.6 Significant Unavoidable Adverse Impacts

With implementation of the recommended mitigation measures and avoidance, when possible, of sensitive areas such as stream and riparian corridors, no significant, unavoidable adverse impacts on wetlands, wildlife and habitat, fish, and threatened and endangered species are identified. Fish-bearing aquatic resources are not located within about 0.5 mile of the project area. Breeding and foraging habitat typically associated with federally listed threatened and endangered species would not be disturbed under the proposed project. While potential bald eagle fatalities associated with operation of the project are possible, the likelihood is considered remote because there have been no documented bald eagle fatalities at other wind power projects in the United States.

Total temporary upland vegetation habitat disturbance would range from 231 acres under the lower end scenario to 370 acres under the upper end scenario. Total permanent habitat disturbance would range from 92.5 acres under the middle scenario to 118 acres under the lower end scenario. The temporary and permanent disturbance of upland vegetation habitat would be compensated for by the mitigation proposal to purchase and protect an approximately 550-acre parcel with equal or better functional habitat characteristics as the project area.